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Educational Manual Training

Wm. C. A. Hammel

Cardboard Construction

No. 2.

B. F. Johnson
Publishing Company
Richmond

CARDBOARD CONSTRUCTION

Cost of Materials
per Pupil.

24 sheets White Bristol Board, medium thickness (11" x 14").....	20c.
1 can Liquid Glue or tube of Photo Paste, 10c. (enough for 5 pupils).....	2c.
Cost per Pupil.....	22c.

TOOLS:	Scissors	12c.
	Brass-tipped Ruler.....	5c.
	Pair of Dividers.....	10c.
	Total.....	27c.

The Scissors, Ruler and Dividers are the same as used in Paper Folding Course.
Instead of White Bristol Board, Colored "Cover-papers" (Princess, Herculean, "Royal Melton," etc.) in the 120 lb. weight may be used.

This material can be obtained through the publishers.

EDUCATIONAL MANUAL TRAINING

CARDBOARD CONSTRUCTION

BY

WM. C. A. HAMMEL

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RICHMOND

B. F. JOHNSON PUBLISHING COMPANY

1903

No. 2



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INTRODUCTION

The course in the construction of models from cardboard is designed to follow the Paper Folding course outlined in Book No. 1 of the series on Educational Manual Training. In Paper Folding the pupil had practical exercises in measuring and drawing, in accurately cutting, folding, and joining. He should have acquired from those exercises some degree of neatness in the appearance of his work, as well as greater self-confidence and skill in the manner of doing it.

Cardboard Construction is one of the least expensive forms of Manual Training. It can be done at the ordinary school desk; the materials are of the simplest kind; the tools are very few, and can easily be kept in order. The finished work is not only attractive in itself, but is useful in many ways in the schoolroom. It affords subjects for lessons in object-drawing, illustrations of geometric forms for the arithmetic and geometry classes, etc.

After finishing the course in Cardboard Construction, the pupil will be able to take up intelligently the course in Elementary Knife Work, which is the next step in the preparation for Wood Sloyd.

SUGGESTIONS.—In the cardboard course, type solids are made of a material more difficult to work in than paper, and, when the model is cut and pasted so as to form the required solid, any inaccuracy in the measurements or drawings is plainly noticeable; thus the necessity for great carefulness at every step is clearly shown. The teacher should therefore insist from the beginning upon perfect accuracy in every detail of the work; otherwise the chief educative value of this course of Manual Training will be lost.

As in Paper Folding, pupils who work rapidly and well should be allowed to continue as fast as they are able to do good work. For these a series of Supplementary Models has been arranged. These models are based on types the pupils have already made, and are presented without directions in order to give them practice in reading and interpreting working drawings. They should be encouraged to make original working drawings and to construct models from the same. The teacher should occasionally make a model not included in this book, and from it require the pupils to make the working drawing and a duplicate of the model.

Straw board, or manila board, is useful for covering the desks upon which the work is done. Any sort of heavy paper, however, will be sufficient protection for the surface of the desk.

Each pupil should make a large envelope or pocket in which to keep his unfinished work. These envelopes or pockets should be collected and put away at the end of each lesson and returned to the pupil at the beginning of the next. In this way scraps and cuttings can be kept together and used up whenever the opportunity occurs.

Where but little time can be devoted to Manual Training, as in ungraded schools, the schedule should be so arranged as to have the Manual Training lesson come between those lessons which require most mental effort on the part of the pupil.

DIRECTIONS.—Too much stress cannot be laid upon the importance of the first few lessons. In these the foundation is laid for a certain method and procedure in future work. At first the teaching should be, as a rule, from the blackboard; minute directions should be given and each step carefully dictated. Later the pupil may be trusted to rely on the printed directions, and thus work more independently.

Pupils should sit in a comfortable but not stooped position, with the light coming from the left.

Take steps in order as numbered: read directions carefully and understand the directions for each step before attempting to follow them.

The drawing of the plan on the cardboard should be exact and should be taken from actual measurement of the model, from a scale drawing, or from a blackboard drawing.

The scissors should be held with the thumb and the second finger. Begin to cut near the pivot, and do not cut the whole length of the blade.

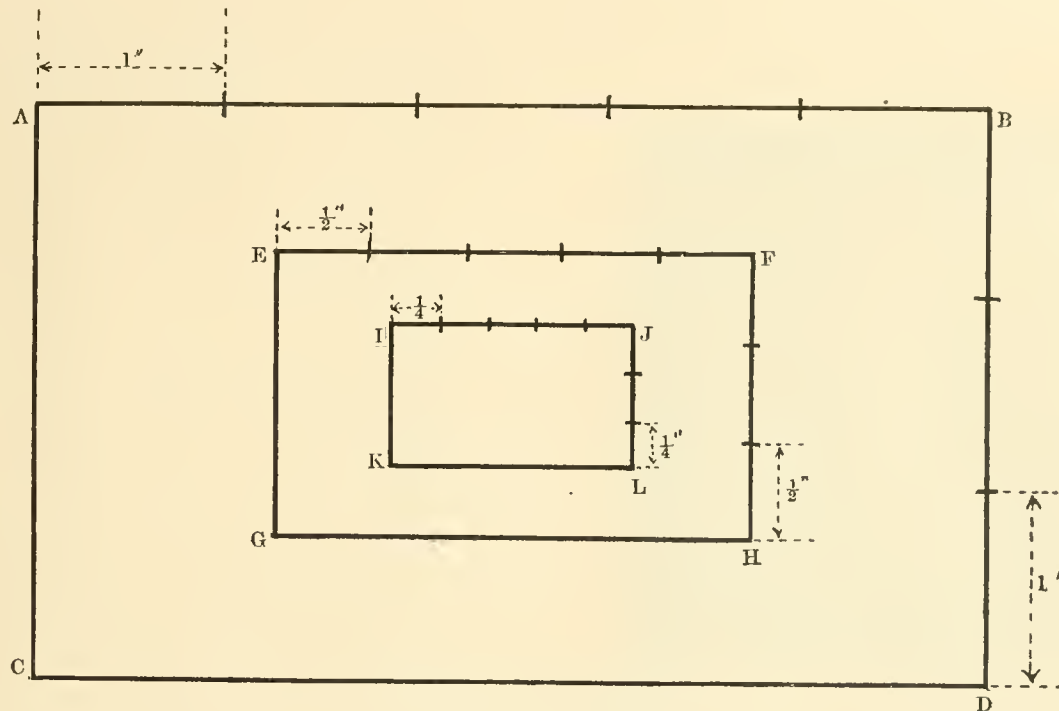
On lines where the cardboard is to be folded, it is necessary to "score," or lightly cut through, the surface of the cardboard in order to make a clean fold. Use the sharp point of the scissors or of a penknife for scoring, and fold the cardboard so that the *scored line will be opened*.

Laps are left on edges to be joined and must be pasted to the inside of the model.

Spread the glue or paste upon the lap of the model with a toothpick or a small strip of cardboard. When the model has a number of surfaces to be pasted together, instead of applying the paste to all the laps at once, it is well to apply it to one or two surfaces only at a time. Hold these pasted portions together for a moment until they adhere; then paste the other surfaces in the same way until the model is completed.

In some of the Supplementary Models the edges are fastened together by means of narrow strips of gummed paper or of book binder's cloth, either of which may be obtained in assorted colors in packages of 100 strips each, $\frac{3}{8}$ " and $\frac{1}{2}$ " wide. Better still, narrow strips of paper may be gummed by the pupil as needed, or narrow strips of cardboard of which the model is made may be scored and gummed.

W. C. A. H.



Working Diagrams

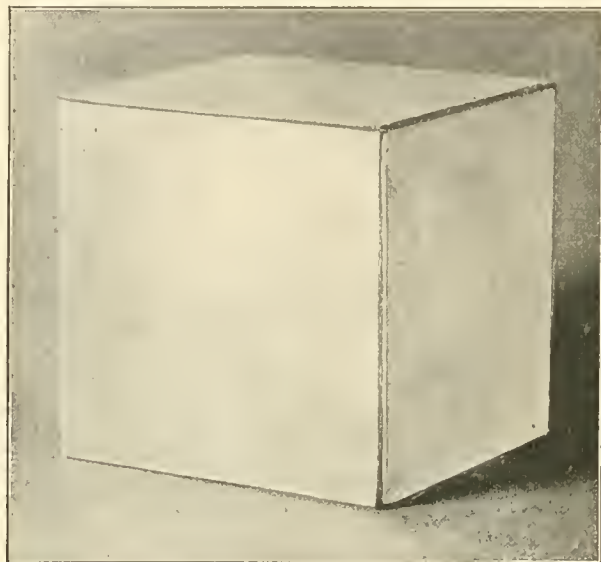
Let us suppose that we wish to represent a plan of the top of a table 3 feet wide and 5 feet long. We could get a sheet of paper large enough to draw the plan full-size, that is, 3 feet by 5 feet, but it would be much easier and more practical to let one inch in the drawing represent one foot of the real object, as rectangle ABCD. Or, let one-half inch in the drawing represent one foot of the real object, as rectangle EFGH; or let one-fourth inch in the drawing

represent one foot of the real object, as in rectangle IJKL.

A working drawing, or a diagram drawing, to a scale is nothing more than a "make-believe" full-size drawing. We notice in the above diagram that, although each rectangle is drawn to a different scale, the shape of the outline of each is the same. When a drawing is not full-size, the scale must be written under it. In the following working diagrams the scale is 1 inch = 2 inches, or half-size.

MODEL No. 1

CUBE

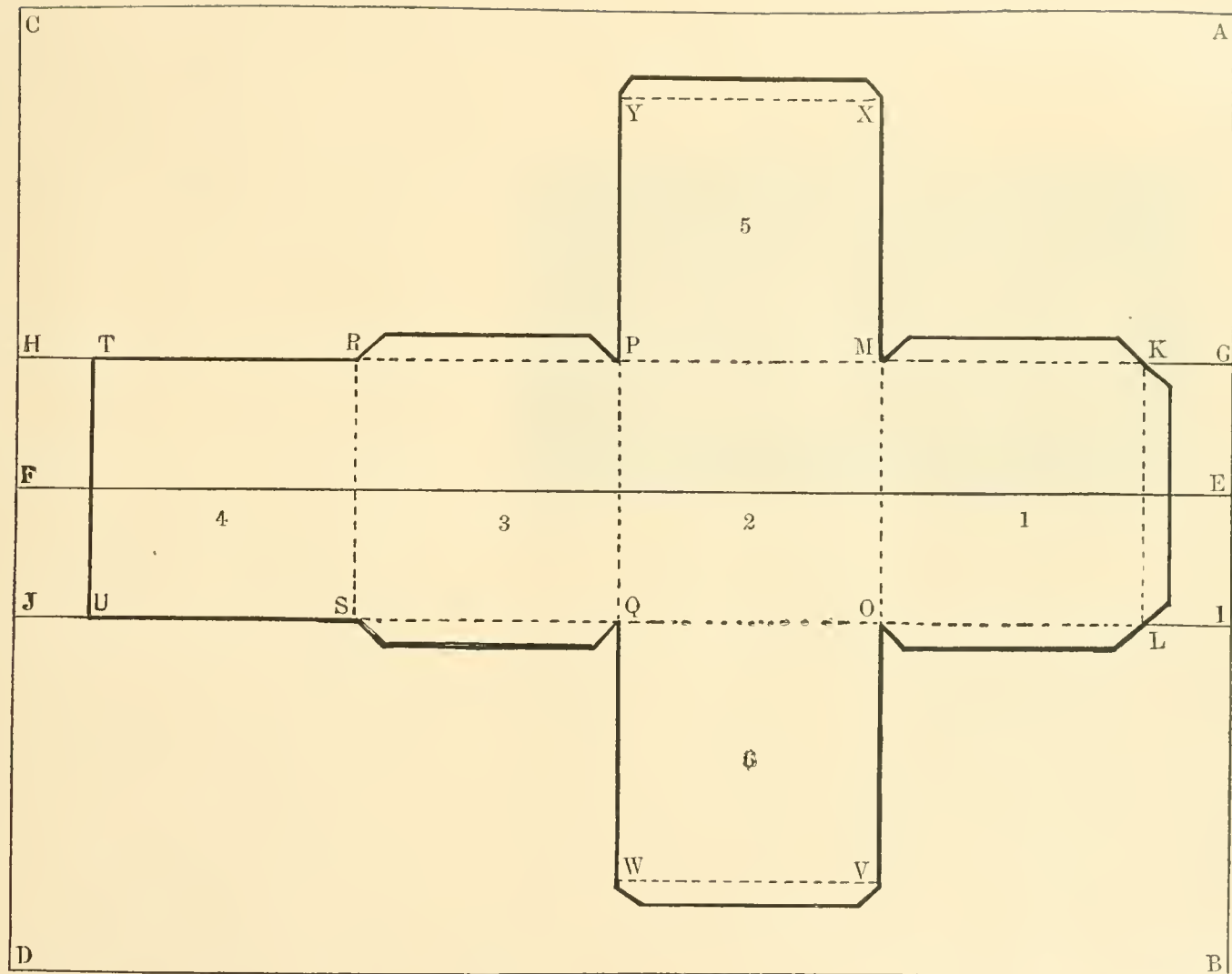


Directions for Constructing Model No. 1

1. Draw the longer (longitudinal) diameter EF.
2. One and one-half ($1\frac{1}{2}$) inches below the line EF draw IJ equal and parallel to it.
3. One and one-half inches above the line EF draw GH equal and parallel to it.
4. One inch to the left of line GI, equal and parallel to it, draw KL.
5. On line GH, three inches to the left of point K, mark point M.
6. On line GH, three inches to the left of point M, mark point P.
7. On line GH, three inches to the left of point P, mark point R.
8. On line GH, three inches to the left of point R, mark point T.
9. On line IJ, three inches to the left of point L, mark point O.
10. On line IJ, three inches to the left of point O, mark point Q.
11. On line IJ, three inches to the left of point Q, mark point S.
12. On line IJ, three inches to the left of point S, mark point U.
13. Connect by straight lines points M and O, P and Q, R and S, and T and U.
14. Extend line MO three inches in each direction to points X and V.
15. Extend line PQ three inches in each direction to points Y and W.
16. Connect by straight lines X and Y, and V and W.
17. Number squares as in working diagram.
18. Draw $\frac{1}{4}$ -inch margins, or laps, on sides LO, XY, QS, PR, VW, KM and KL.
19. Cut on heavy lines (see working diagram).
20. Score and fold on dotted lines (see working diagram).
21. Paste to form a cube.

MODEL No. 1

CUBE—Working Diagram



MODEL No. 2

SQUARE PRISM

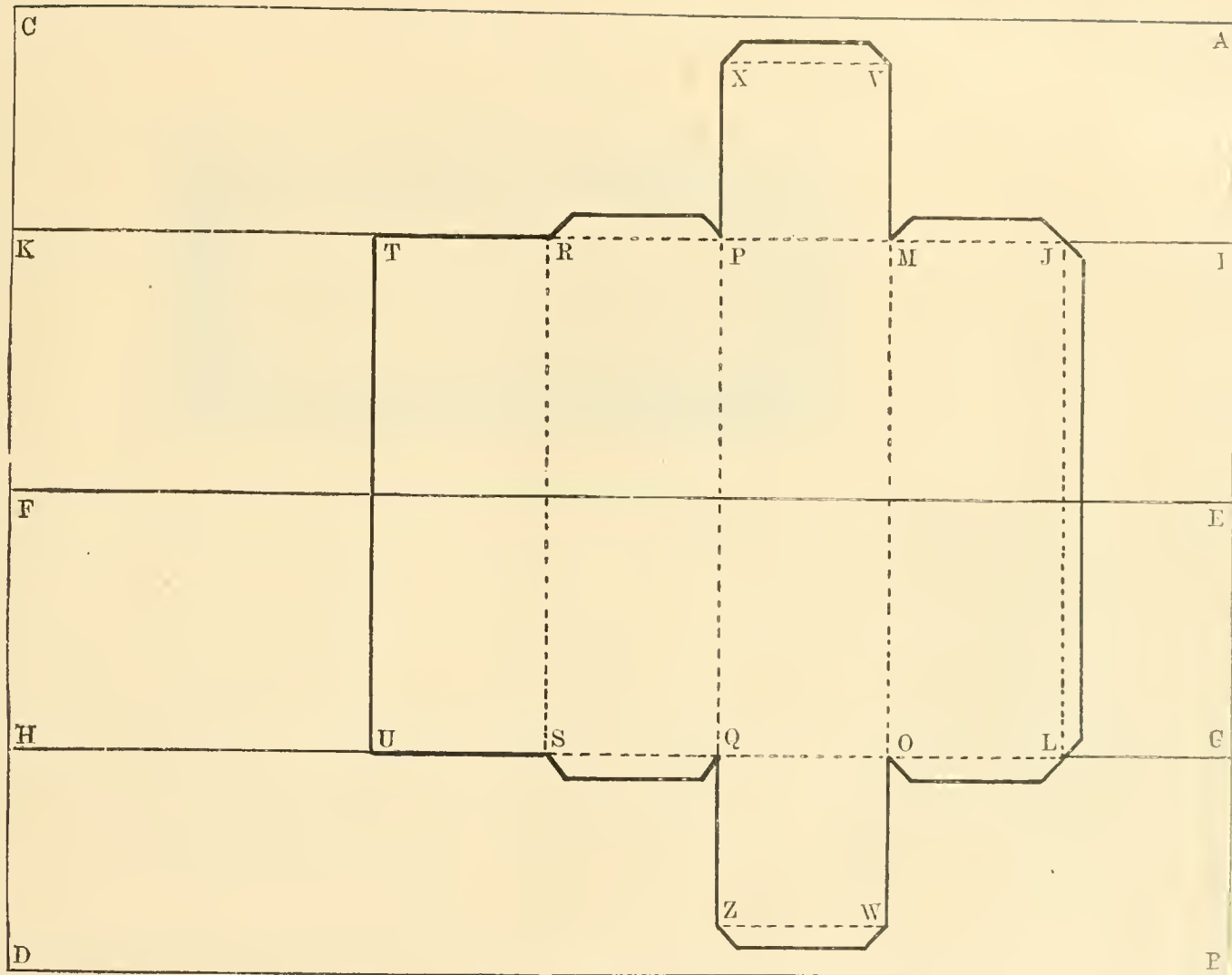


Directions for Constructing Model No. 2

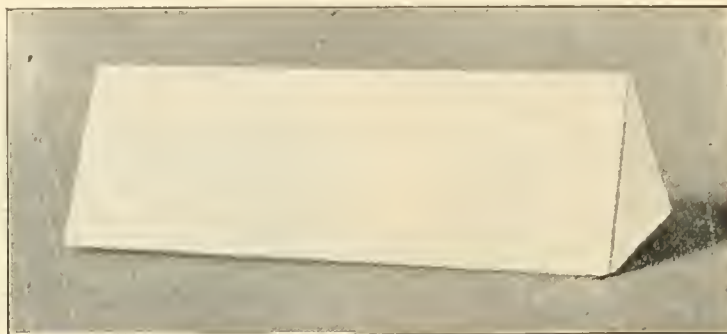
1. Draw the longer (longitudinal) diameter EF.
2. Three inches below the line EF draw line GH equal and parallel to it.
3. Three inches above the line EF draw line IK equal and parallel to it.
4. Two inches from IG, equal and parallel to it, draw JL.
5. On line IK, two inches to the left of point J, mark point M.
6. On line IK, two inches to the left of point M, mark point P.
7. On line IK, two inches to the left of point P, mark point R.
8. On line IK, two inches to the left of point R, mark point T.
9. On line GH, two inches to the left of point L, mark point O.
10. On line GH, two inches to the left of point O, mark point Q.
11. On line GH, two inches to the left of point Q, mark point S.
12. On line GH, two inches to the left of point S, mark point U.
13. Connect by straight lines points M and O, P and Q, R and S, and T and U.
14. Extend line MO two inches in each direction to points V and W.
15. Extend line PQ two inches in each direction to points X and Z.
16. Connect by straight lines points V and X, and W and Z.
17. Draw $\frac{1}{4}$ " margins, or laps, on sides LO, WZ, QS, PR, VX, JM and JL.
18. Cut on heavy lines; score and fold on dotted lines (see working diagram).
19. Paste to form a square prism.

MODEL No. 2

SQUARE PRISM—Working Diagram



TRIANGULAR PRISM



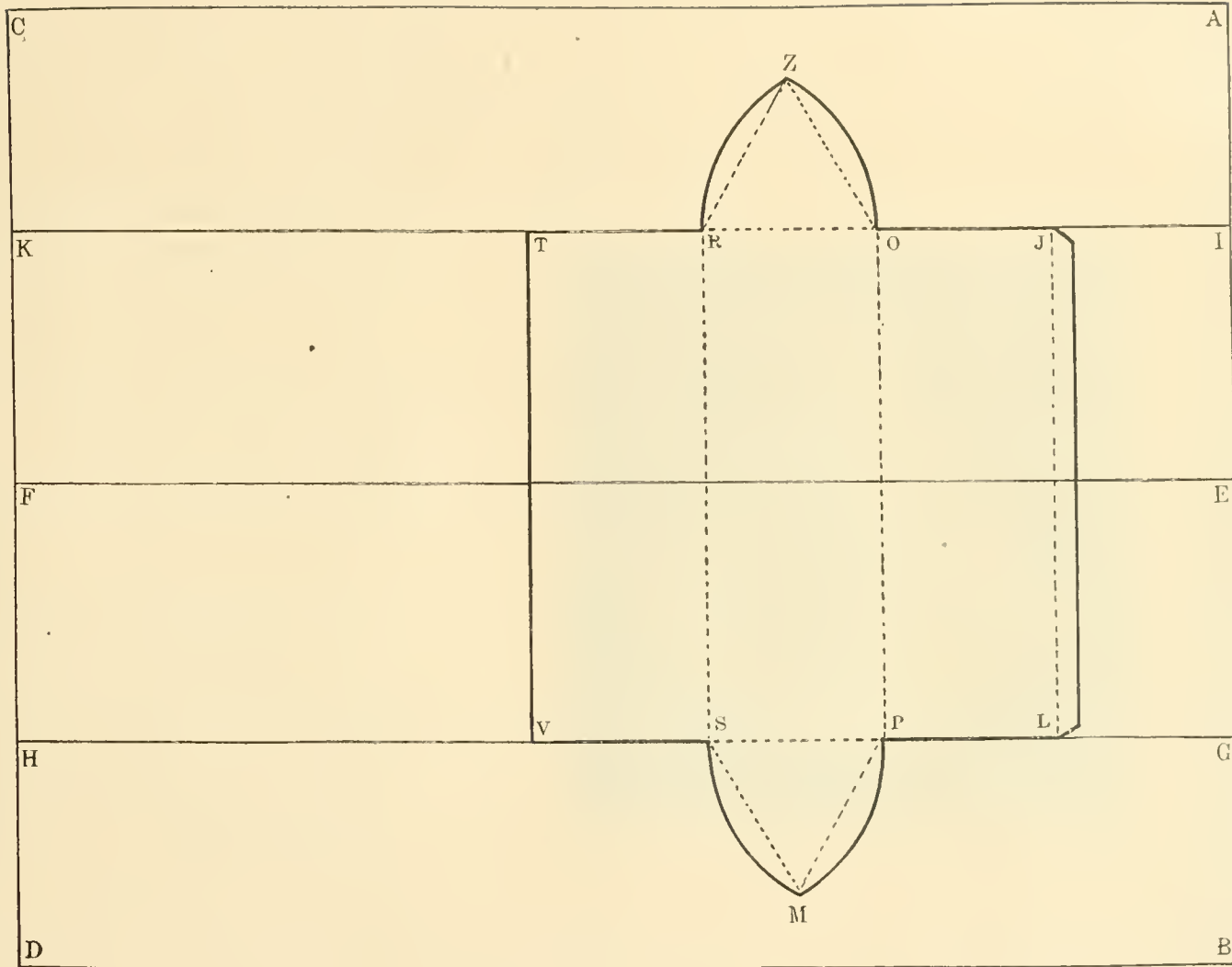
Directions for Constructing Model No. 3

1. Draw longer (longitudinal) diameter EF.
2. Three inches below the line EF draw line GH equal and parallel to it.
3. Three inches above the line EF draw line IK equal and parallel to it.
4. Two inches to the left of line IG, equal and parallel to it, draw line JL.
5. On line IK, two inches to the left of point J, mark point O.
6. On line IK, two inches to the left of point O, mark point R.
7. On line IK, two inches to the left of point R, mark point T.
8. On line GH, two inches to the left of point L, mark point P.
9. On line GH, two inches to the left of point P, mark point S.
10. On line GH, two inches to the left of point S, mark point V.
11. Connect by straight lines points O and P, R and S, and T and V.
12. On line PS construct equilateral triangle* PMS.
13. On line OR construct equilateral triangle OZR.
14. Draw $\frac{1}{4}$ " lap on line JL.
15. Use curved laps on sides of each triangle.
16. Cut on heavy lines; score and fold on dotted lines (see working diagram).
17. Paste to form a triangular prism.

*For construction of equilateral triangle see Model No. 9, Book I, Paper Folding.

MODEL No. 3

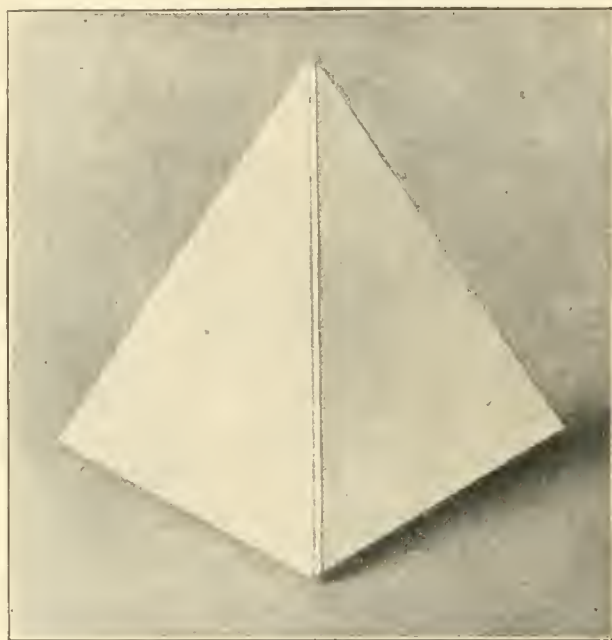
TRIANGULAR PRISM—Working Diagram



MODEL No. 4

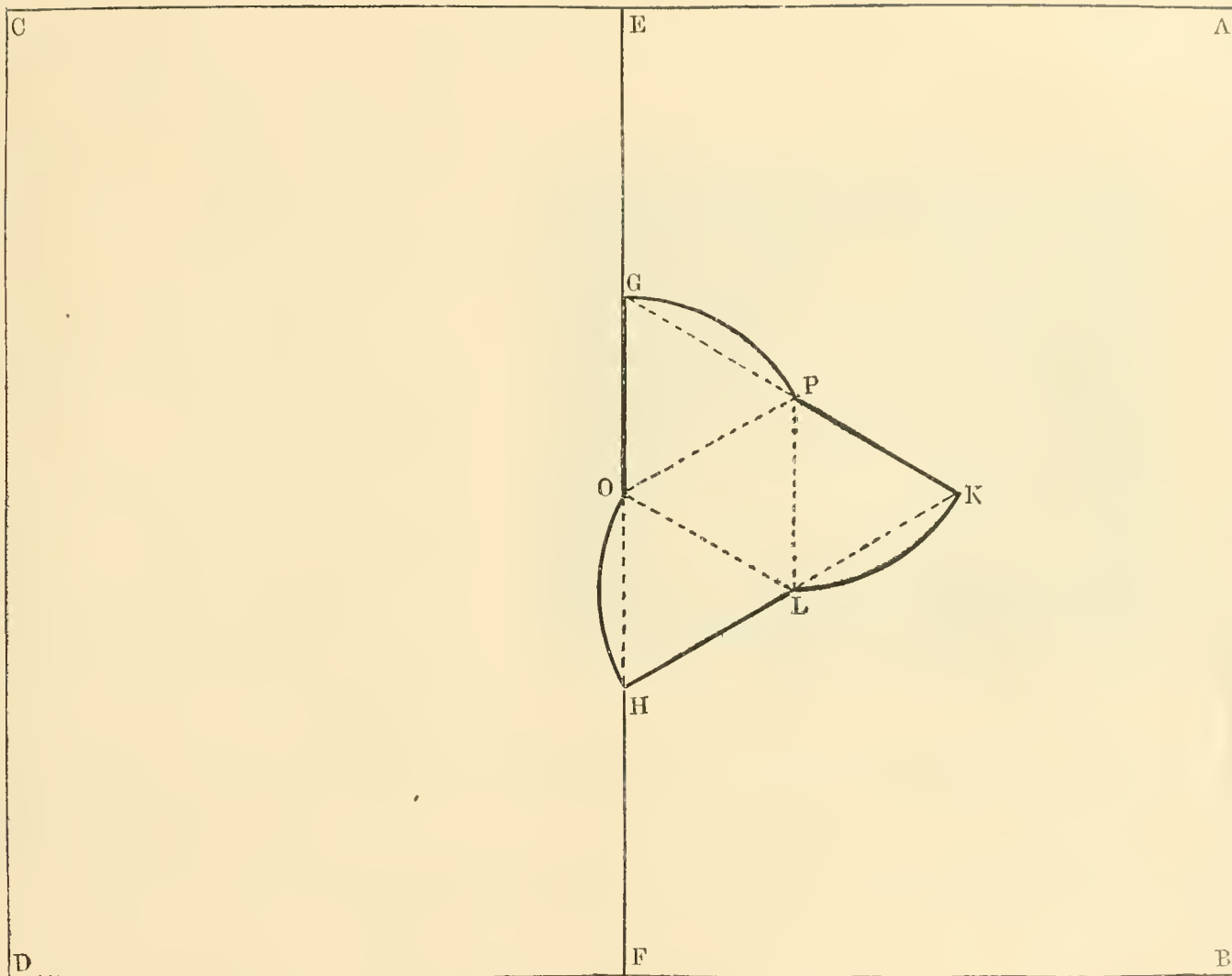
TRIANGULAR PYRAMID

Directions for Constructing Model No. 4



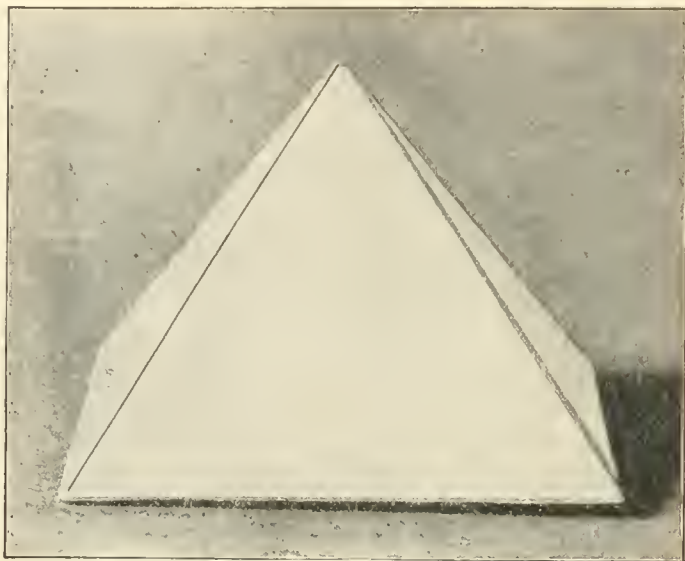
1. Draw shorter diameter EF.
2. On line EF mark off line GH four and one-half inches long.
3. On line GH construct equilateral triangle GKH.
4. Bisect side KH; mark point L.
5. Bisect side GH; mark point O.
6. Bisect side KG; mark point P.
7. Connect by straight lines points P and L, L and O, and O and P.
8. With P as center and PK as radius, describe arc of circle KL (making lap on KL).
9. With L as center and LH as radius, describe arc of circle HO (making lap on HO).
10. With O as center and OG as radius, describe arc of circle GP (making lap on GP).
11. Cut on heavy lines; score and fold on dotted lines (see working diagram).
12. Paste to form a triangular pyramid.

TRIANGULAR PYRAMID—Working Diagram



MODEL No. 5

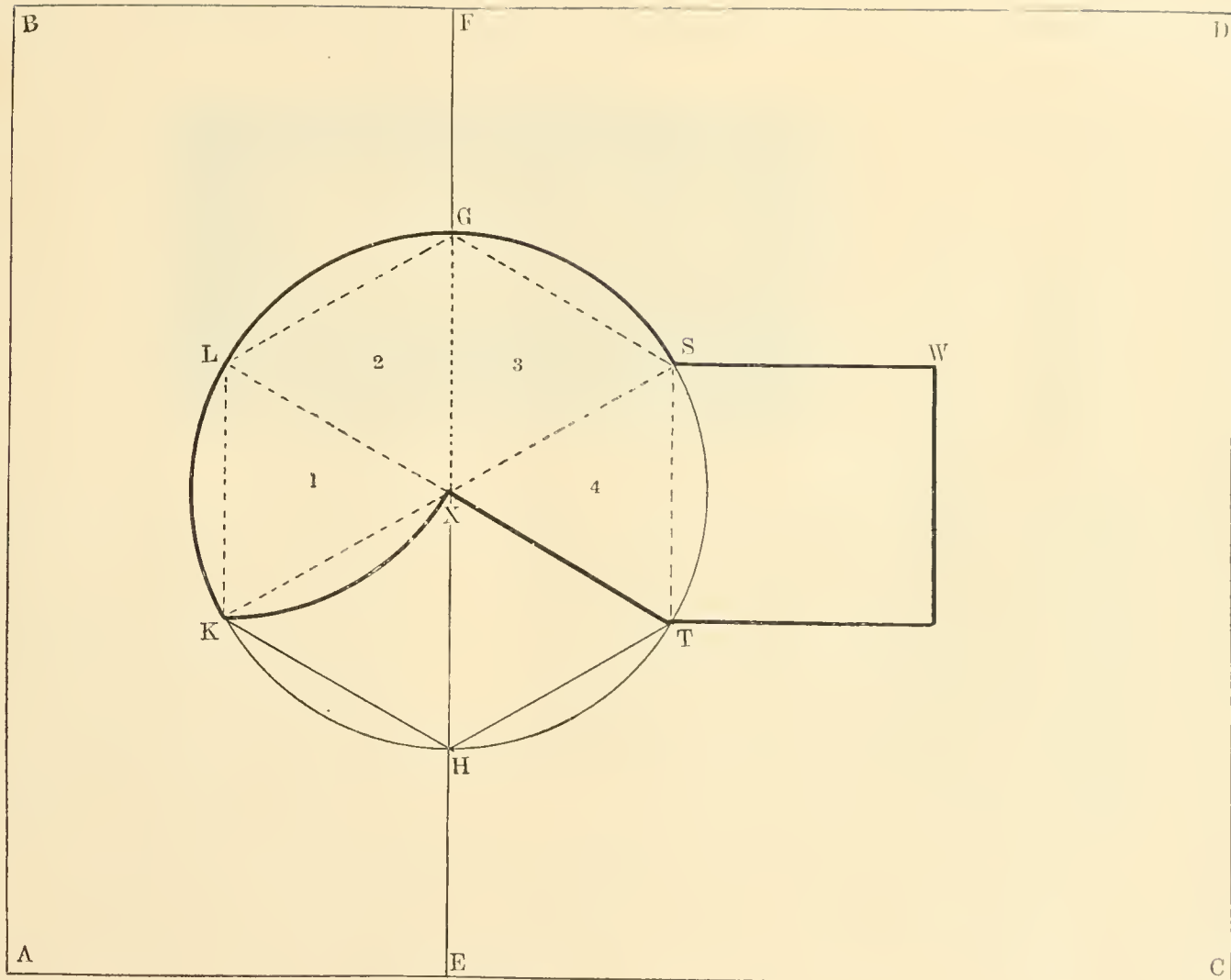
SQUARE PYRAMID



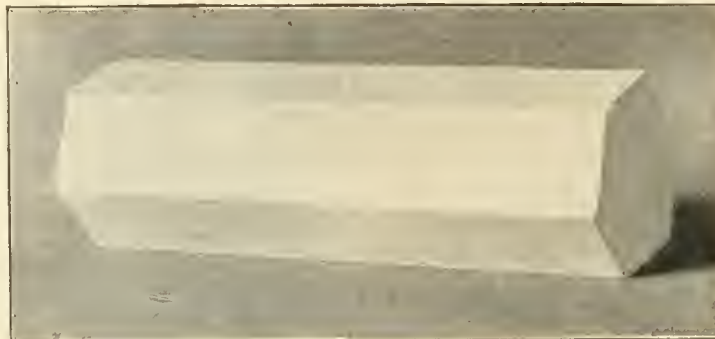
Directions for Constructing Model No. 5

1. Mark upper right hand corner D, lower left hand corner A, lower right hand corner C, upper left hand corner B.
2. Five inches from left edge AB draw line EF equal and parallel to it.
3. Bisect line EF; mark point X.
4. With X as center and a radius of three inches, describe a circle.
5. Where circumference of circle intersects EF mark points G and H.
6. With G as center and GX as radius, mark points L and S on circumference of circle.
7. With H as center and HX as radius, mark points K and T on circumference of circle.
8. Connect by straight lines points G and S, S and T, T and H, H and K, K and L, and L and G, making the hexagon GSTHKL.
9. Connect by straight lines points K and S, and L and T.
10. Number triangles as in working diagram.
11. With L as center and LK as radius draw curved lap on KX.
12. On line ST construct square TSWV. (Direction of line TV is found by placing ruler so that the line, if produced, would pass through points T and K.)
13. Cut on heavy lines; score and fold on dotted lines.
14. Paste to form a square pyramid.

SQUARE PYRAMID—Working Diagram



HEXAGONAL PRISM



Directions for Constructing Model No. 6

1. Draw shorter diameter WX.
2. Three inches to right of line WX draw line FV parallel to it.
3. Three inches to left of line WX draw line ET parallel to it.
4. One inch from edge BD draw line EF parallel to it.
5. On line ET, six inches below point E, mark point T.
6. On line FV, six inches below point F, mark point V.
7. Connect by straight line points T and V.
8. Divide figure EFTV into six rectangles, each 1 inch by 6 inches.
9. On right of line HK construct a hexagon.

To CONSTRUCT A HEXAGON ON GIVEN LINE HK:

 - a. With H as center and HK as radius, describe arc of circle (see Fig. I).
 - b. With K as center and KH as radius, describe arc of circle.
 - c. Where arcs intersect mark point Q.
 - d. With Q as center and QH as radius, describe a circle.
 - e. With H as center and HK as radius, mark point 1 on the circumference of circle.
 - f. With K as center and KH as radius, mark point 4 on the circumference of circle.
 - g. With 1 as center and 1-H as radius, mark point 2 on the circumference of circle.
 - h. With 4 as center and 4-K as radius, mark point 3 on the circumference of circle.
10. On left of line GI construct a hexagon (see Fig. II).
11. Make laps $\frac{1}{4}$ " wide on sides EF, FH, KM, MP, PS, SV, RT, OR, OL, LI and GE.
12. Cut on heavy lines; score and fold on dotted lines.
13. Paste to make a hexagonal prism.

HEXAGONAL PRISM—Working Diagrams

Fig. II.

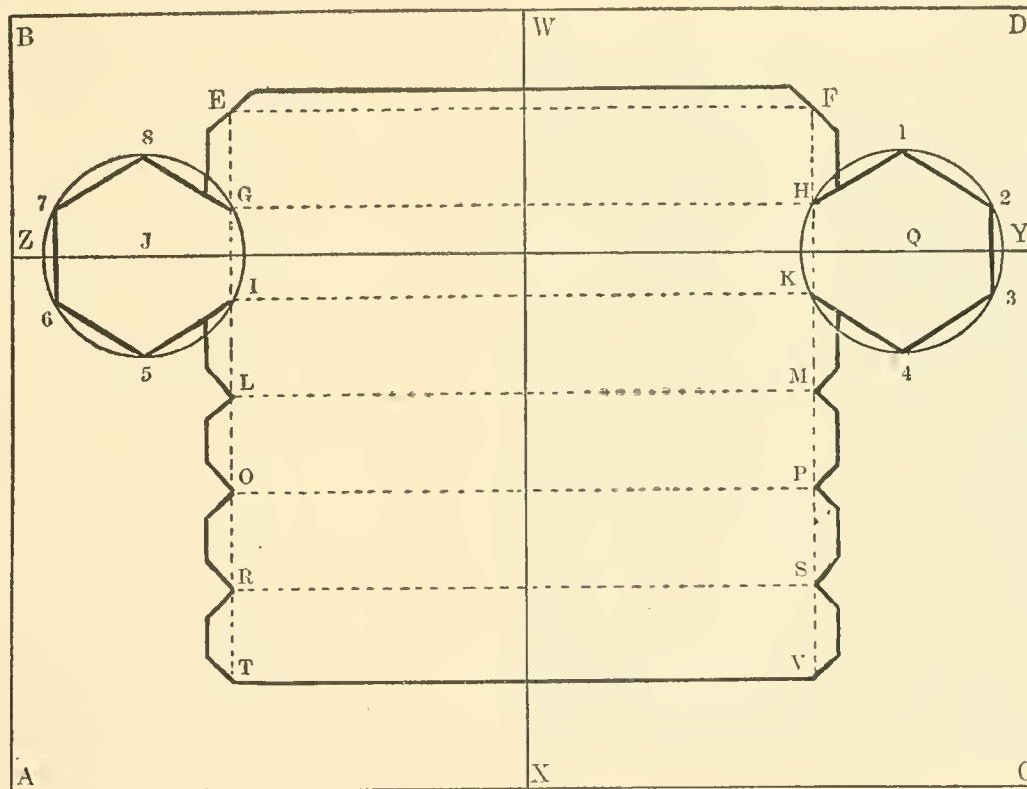
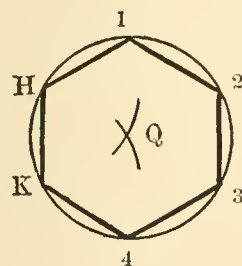
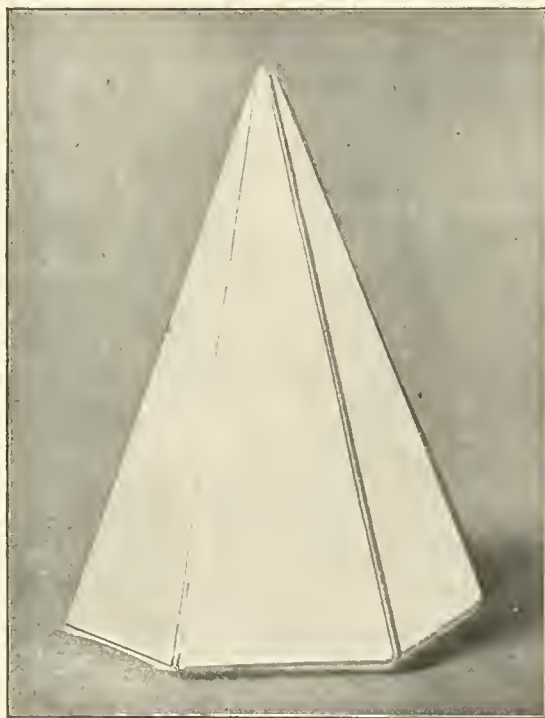


Fig. I



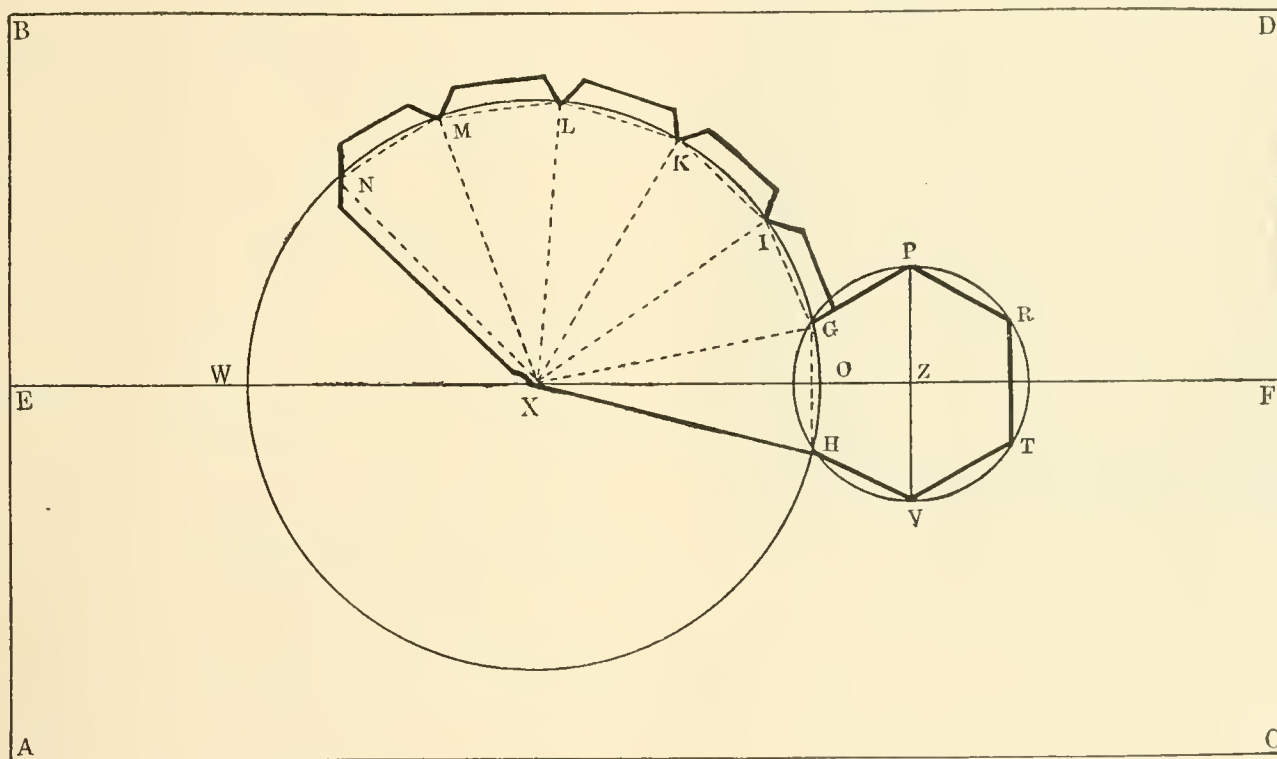
HEXAGONAL PYRAMID



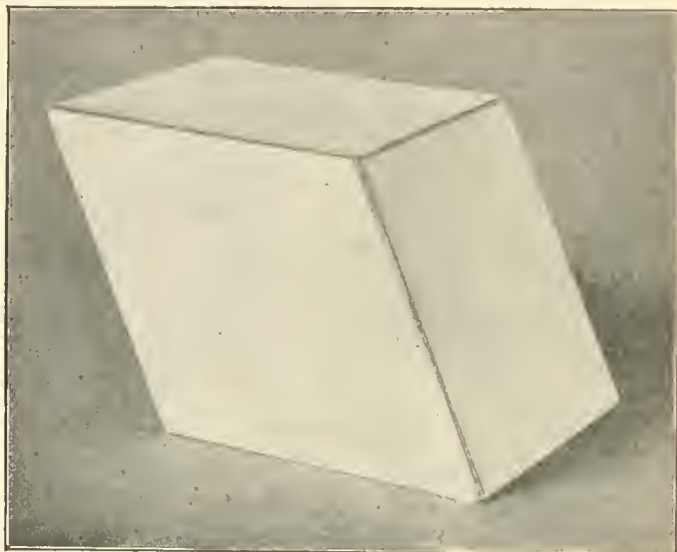
Directions for Constructing Model No. 7

1. Draw longer diameter EF.
2. On line EF, five and one-half inches from point E, mark point X.
3. With X as center, draw a circle having a radius of three inches.
4. Where EF intersects circumference of circle mark points O and W.
5. With O as center and a radius of $\frac{5}{8}$ inch, mark on circumference of circle points G and H.
6. On circumference of circle above point G mark off points I, K, L, M and N, each point $1\frac{1}{4}$ " apart.
7. Connect by straight lines points H and G, G and I, I and K, K and L, L and M, and M and N.
8. Connect by straight lines with the center X points N, M, L, K, I, G and H.
9. On right of line GH construct hexagon GPRTVH. (See Model No. 6.)
10. Place laps $\frac{1}{4}$ " wide on sides NX, NM, ML, LK, KI and IG.
11. Cut on heavy lines; score and fold on dotted lines.
12. Paste to make a hexagonal pyramid.

HEXAGONAL PYRAMID—Working Diagram



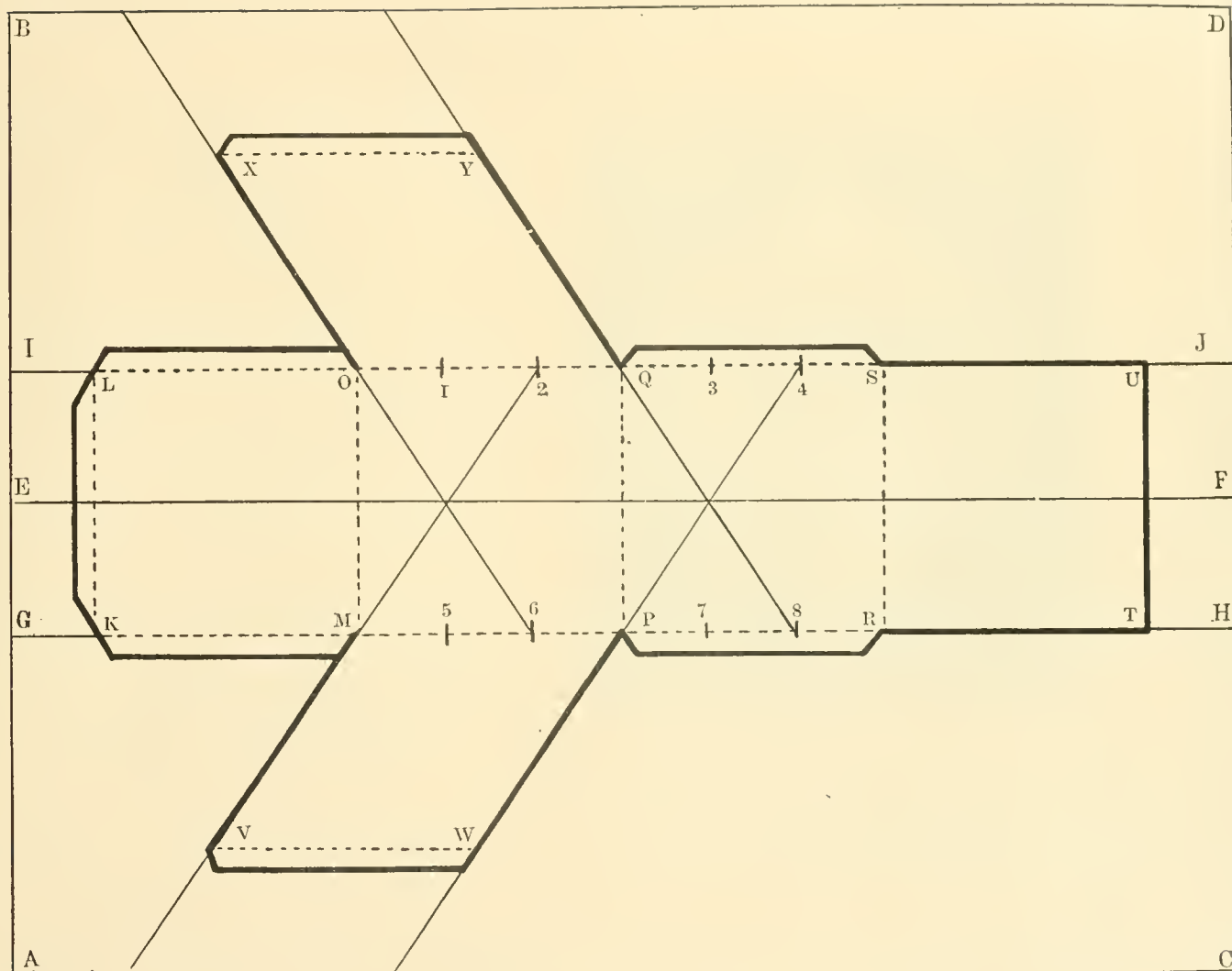
RHOMBIC PRISM



Directions for Constructing Model No. 8

1. Draw longer diameter EF.
2. One and one-half inches above and below diameter draw lines IJ and GH equal and parallel to it.
3. One inch to right of edge IG draw line LK parallel to it.
4. On line IJ, twelve inches from point L, mark point U.
5. On line GH, twelve inches from point K, mark point T.
6. Connect by straight line points U and T.
7. Divide rectangle LUTK into four squares, LOMK, OMPQ, QPRS and RSUT (see working diagram).
8. Trisect sides OQ and QS; mark points 1, 2, and 3, 4 (see working diagram).
9. Trisect sides MP and PR; mark points 5, 6, and 7, 8.
10. Draw straight line through points 6 and O and extend line indefinitely.
11. On this line, three inches from point O, mark point X.
12. Draw straight line through points 8 and Q, and extend line indefinitely.
13. On this line, three inches from point Q, mark point Y.
14. Connect X and Y by straight line.
15. Draw straight line through points 2 and M, and extend line indefinitely.
16. On this line, three inches from point M, mark point V.
17. Draw straight line through points 4 and P, and extend line indefinitely.
18. On this line, three inches from point P, mark point W.
19. Connect by straight line points V and W.
20. Place $\frac{1}{4}$ " laps on sides KL, LO, XY, QS, PR, VW and MK.
21. Cut on heavy lines; score and fold on dotted lines.
22. Paste to make a rhombic prism.

RHOMBIC PRISM—Working Diagram

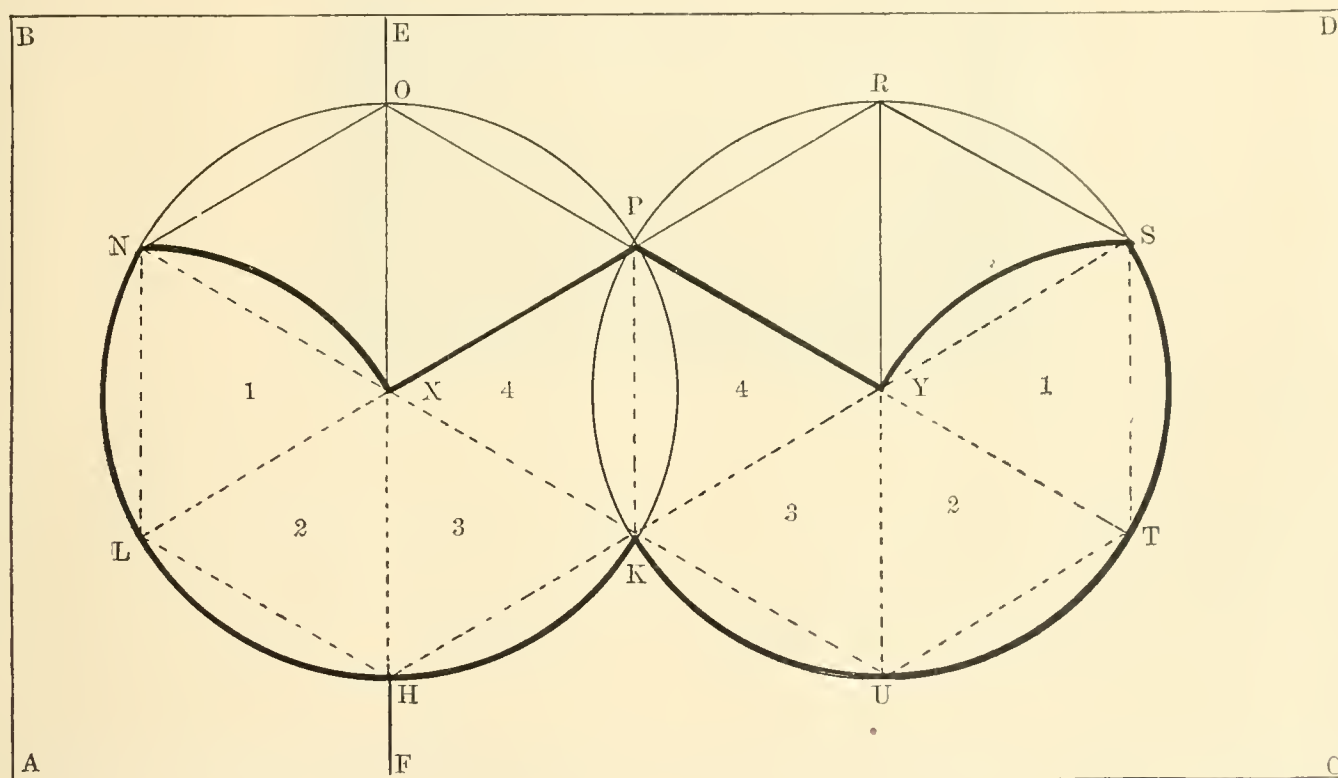


OCTAHEDRON

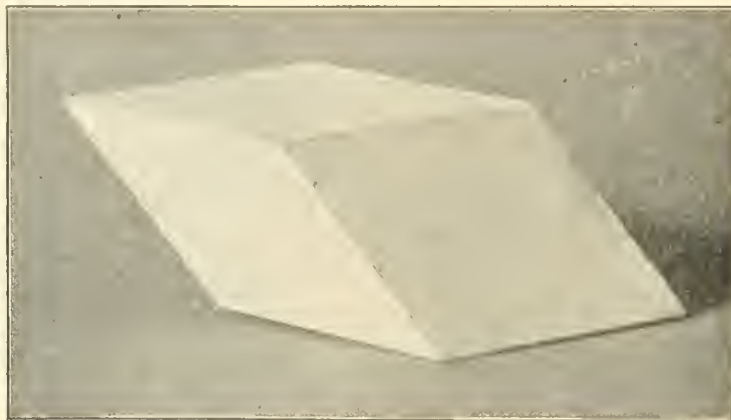
**Directions for Constructing Model No. 9**

1. Four inches from one of the shorter edges of the cardboard draw vertical line EF.
2. Bisect line EF and mark point of bisection X.
3. With X as center and a radius of 3 inches describe a circle.
4. Mark points O and H where line EF intersects circumference of circle.
5. With H as center and HX as radius, mark points K and L on circumference of circle.
6. With O as center and OX as radius, mark points N and P on circumference of circle.
7. Connect by straight lines O and P, P and K, H and K, H and L, L and N, and N and O.
8. With P as center and PK as radius, describe arc of circle to the right of line PK.
9. With K as center and KP as radius, describe arc of circle to the right of line PK.
10. Where arcs intersect mark point Y.
11. With Y as center and a radius of 3 inches, describe circle.
12. Starting at point K, mark off on circumference of circle four points, U, T, S and R, each three inches apart.
13. Connect by straight lines points P and R, R and S, S and T, T and U, and U and K.
14. Connect by straight lines points L and P, and K and N.
15. Connect by straight lines points R and U, S and K, and P and T.
16. With T as center and TY as radius, draw curved lap on YS.
17. With L as center and LX as radius, draw curved lap on NX.
18. Cut on heavy lines; score and fold on dotted lines.
19. Paste to form an octahedron.

OCTAHEDRON—Working Diagram



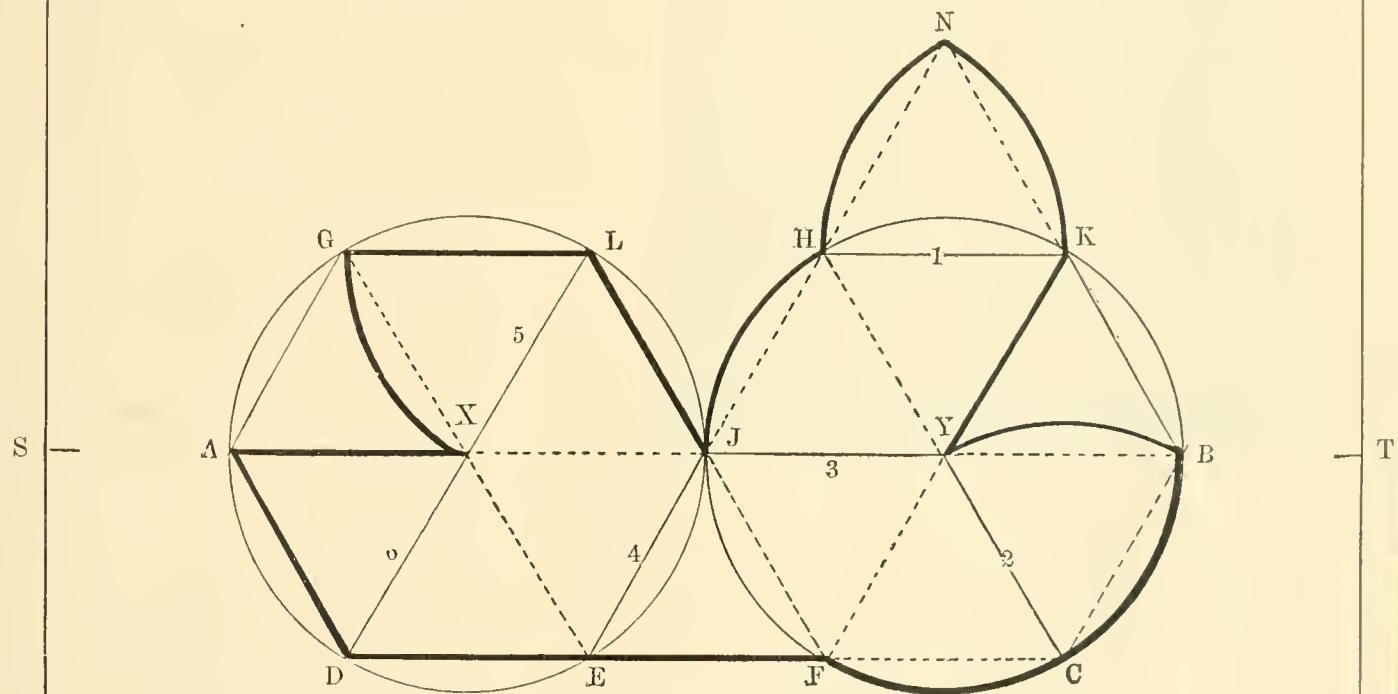
RHOMBOHEDRON



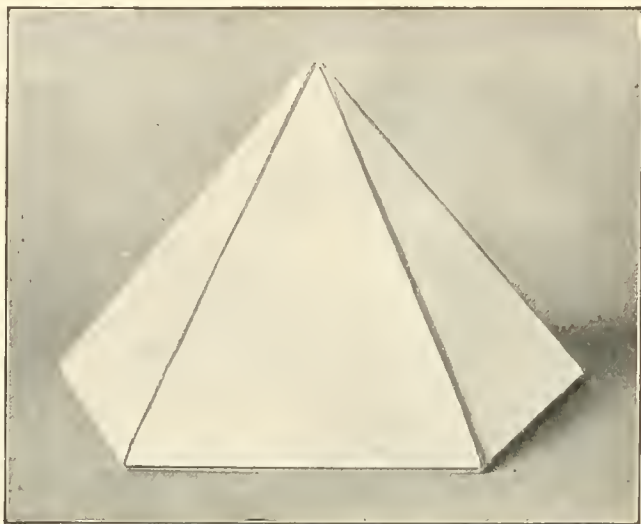
Directions for Constructing Model No. 10

1. Draw longer diameter ST.
2. On line ST, 2" to right of point S, mark point A.
3. On line ST, 10" to right of point A, mark point B.
4. On line ST, $2\frac{1}{2}$ " to the right of point A, mark point X.
5. On line ST, $2\frac{1}{2}$ " to the left of point B, mark point Y.
6. With X as center and XA as radius, describe a circle.
7. With Y as center and YB as radius, describe a circle.
8. Construct hexagon in each circle, and letter as in working diagram (AGLJED and BKHJFC being the hexagons inscribed in the circles).
9. On side HK construct equilateral triangle HNK.
10. Produce line DE to point F.
11. Connect by straight lines points G and E, L and D, K and F and H and C.
12. With C as center and CB as radius, place curved lap on side YB.
13. With L as center and LX as radius, place curved lap on side GX.
14. Cut on heavy lines; score and fold on dotted lines
15. Paste to form a rhombohedron.

RHOMBOHEDRON—Working Diagram



PENTAGONAL PYRAMID

**Directions for Constructing Model No. 11**

1. Draw in middle of cardboard a vertical line BC, $3\frac{3}{4}$ " long (see Fig. II).
2. Construct a regular pentagon within a circle of which BC is the diameter.

TO CONSTRUCT A REGULAR PENTAGON WITHIN A CIRCLE, THE DIAMETER BEING GIVEN:

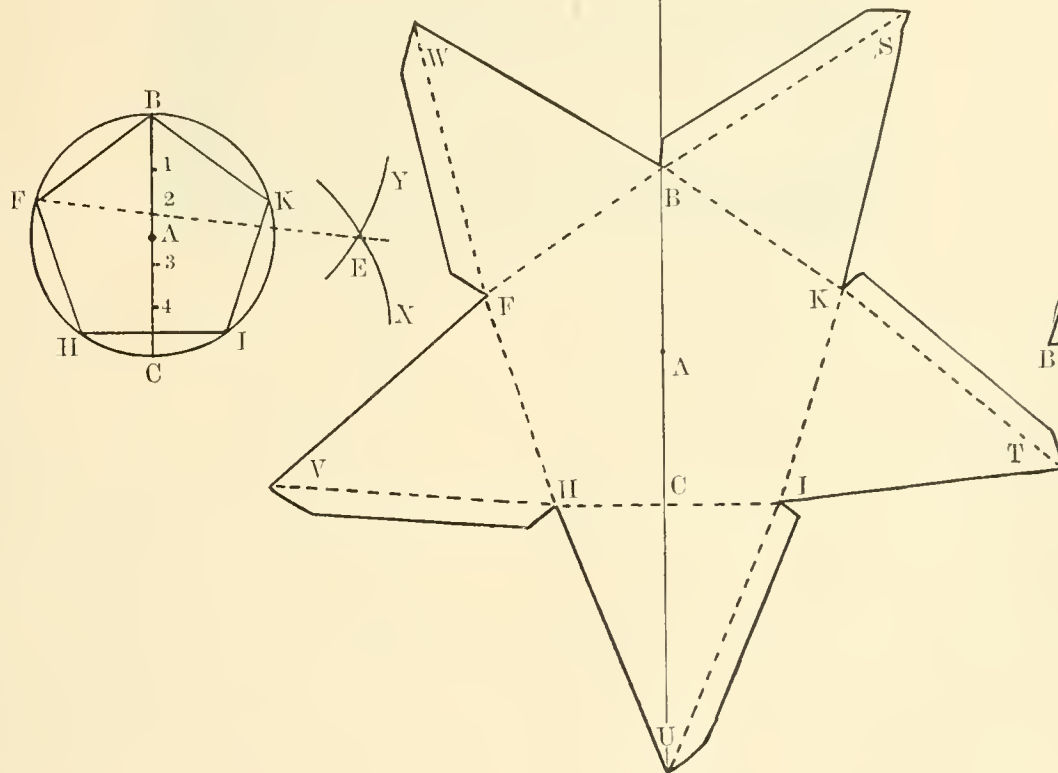
- a. Bisect line BC at point A, and with A as center and BA as radius, describe a circle.
- b. With B as center and BC as radius, describe arc Y.

- c. With C as center and CB as radius, describe arc X.
 - d. Mark point E where arcs intersect.
 - e. Divide line BC into five equal parts; number points of division 1, 2, 3, 4.
 - f. Draw straight line through points E and 2, and produce it to circumference of circle at F.
 - g. Connect by straight line F and B. (FB is one side of the pentagon.)
 - h. Inscribe regular pentagon BFHIK (see Fig. I and Fig. II).
3. Construct on each side of pentagon an isosceles triangle having an altitude of 3".

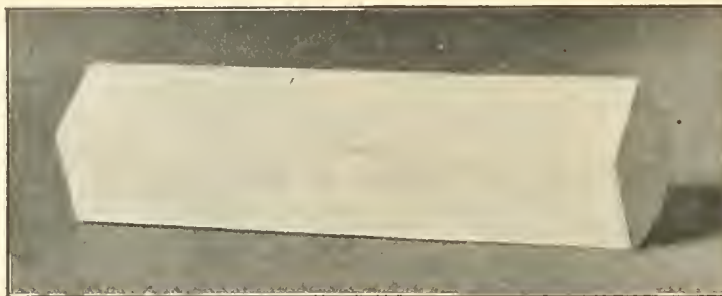
TO CONSTRUCT AN ISOSCELES TRIANGLE HAVING AN ALTITUDE OF 3":

- a. Bisect line BK at O (see Fig. III).
 - b. With B as center and BK as radius, describe arc of circle.
 - c. With K as center and KB as radius, describe arc of circle.
 - d. Mark point where arcs intersect N.
 - e. Draw straight line OS three inches long, passing from point O through point N.
 - f. Connect by straight lines points B and S, and K and S. BSK is an isosceles triangle with altitude of 3" (see Fig. II).
4. Place $\frac{1}{4}$ " laps on sides BS, KT, IU, HV and FW (see Fig. II).
 5. Cut on heavy lines; score and fold on dotted lines.
 6. Paste to make a pentagonal pyramid.

Fig. III



PENTAGONAL PRISM



Directions for Constructing Model No. 12

1. Draw a rectangle ABCD five inches by six inches.
2. Divide rectangle ABCD into five rectangles one inch by six inches.
3. Bisect the sides HK and EF of the middle rectangle EHKF (see working diagram).
4. Draw a straight line through the points of bisection, extending this line beyond the points of bisection (see Fig. II).
5. On the line EF construct a regular pentagon in the following manner:
 - a. With E as center and a radius equal to EF, construct circle No. 1 (see Fig. I).
 - b. With F as center and a radius equal to EF, construct circle No. 2.
 - c. Mark point X where the circumferences of these two circles intersect within the figure.
 - d. With X as center and a radius equal to XF, construct circle No. 3.
 - e. Mark point N where circle No. 3 crosses bisecting line.
 - f. Mark points V and W where circle No. 3 intersects circle No. 1 and circle No. 2.
 - g. Draw a straight line through points W and N to the circumference of circle No. 1; mark point Z.
 - h. Connect by straight line points E and Z.
 - i. Draw a straight line through points V and N to the circumference of circle No. 2; mark point U.
 - j. Connect by straight line points U and F.
 - k. With Z as center and ZE as radius, mark point J on the line bisecting EF.
 - l. Connect by straight lines points J and Z, and J and U. JZEFU is a regular pentagon.
6. Construct a pentagon on side HK in the same way.
7. Place $\frac{1}{4}$ " laps on AB, BG, GH, KM, MC, LD, FL, EI and AI.
8. Cut on heavy lines; score and fold on dotted lines.
9. Paste to make a pentagonal prism.

PENTAGONAL PRISM—Working Diagrams

Fig. I

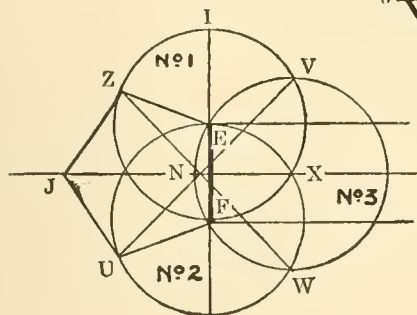
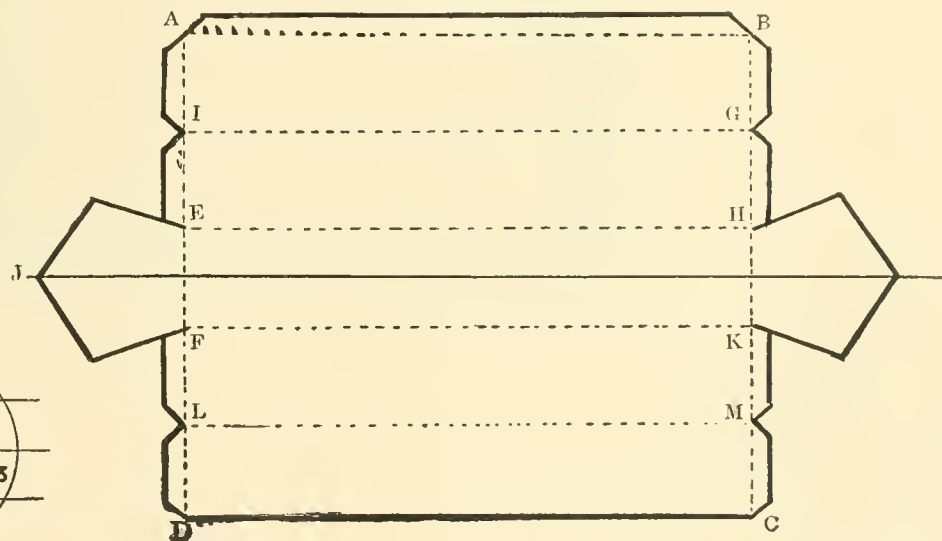
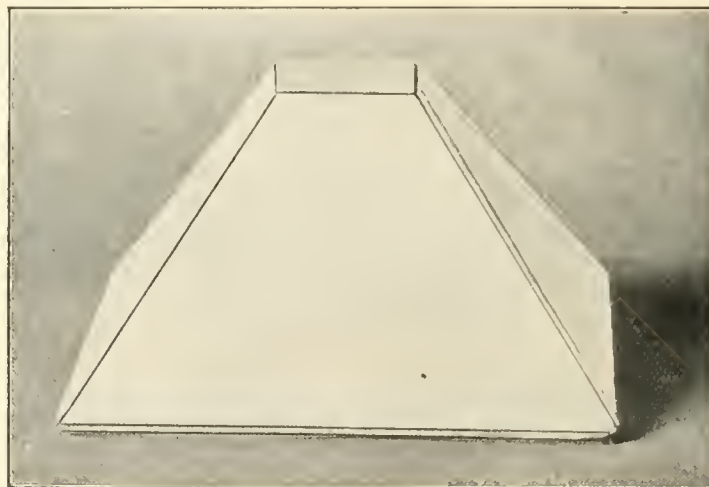


Fig. II



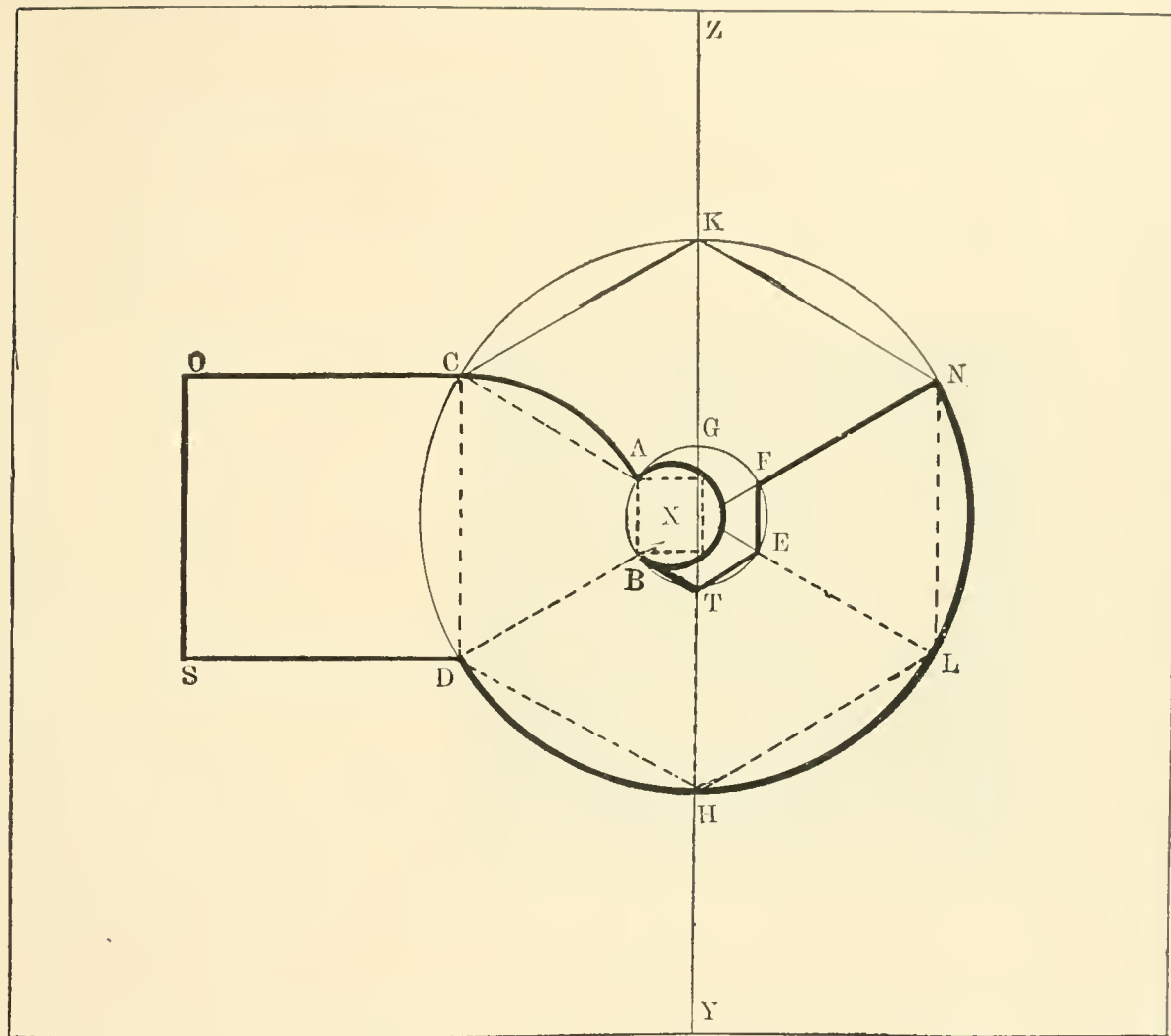
FRUSTUM OF SQUARE PYRAMID



Directions for Constructing Model No. 13

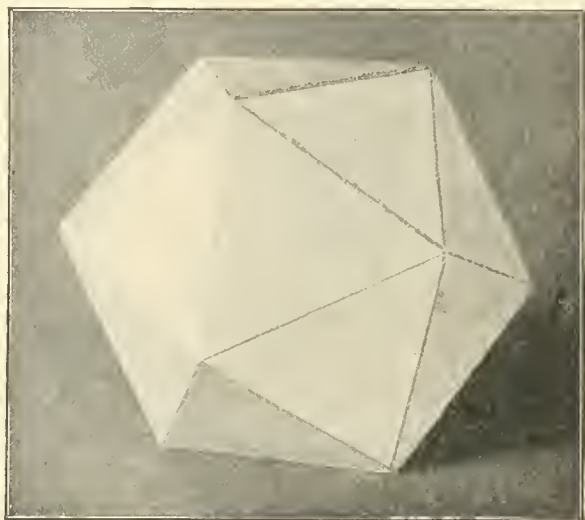
1. Draw shorter diameter ZY.
2. Bisect ZY at point X.
3. With X as center and a radius of 3 inches, describe a circle.
4. Mark points K and H where diameter intersects circumference of circle.
5. With X as center and a radius of $\frac{3}{4}$ -inch, draw another circle.
6. Mark points G and T where circumference intersects diameter.
7. Construct hexagon KNLHDC within the larger circle.
8. Construct hexagon GFETBA within the smaller circle.
9. Connect by straight lines points NF, LE, TH, DB, AC and KG.
10. Construct square on line CD. (Position of line DS may be obtained by passing straight line through points L and D.)
11. Construct square on line AB (see working diagram).
12. Construct curved lap on side AC. (This may be drawn free-hand.)
13. Construct curved laps on three sides of small square (see working diagram).
14. Cut on heavy lines; score and fold on dotted lines.
15. Paste to make the frustum of a square pyramid.

FRUSTUM OF SQUARE PYRAMID—Working Diagram



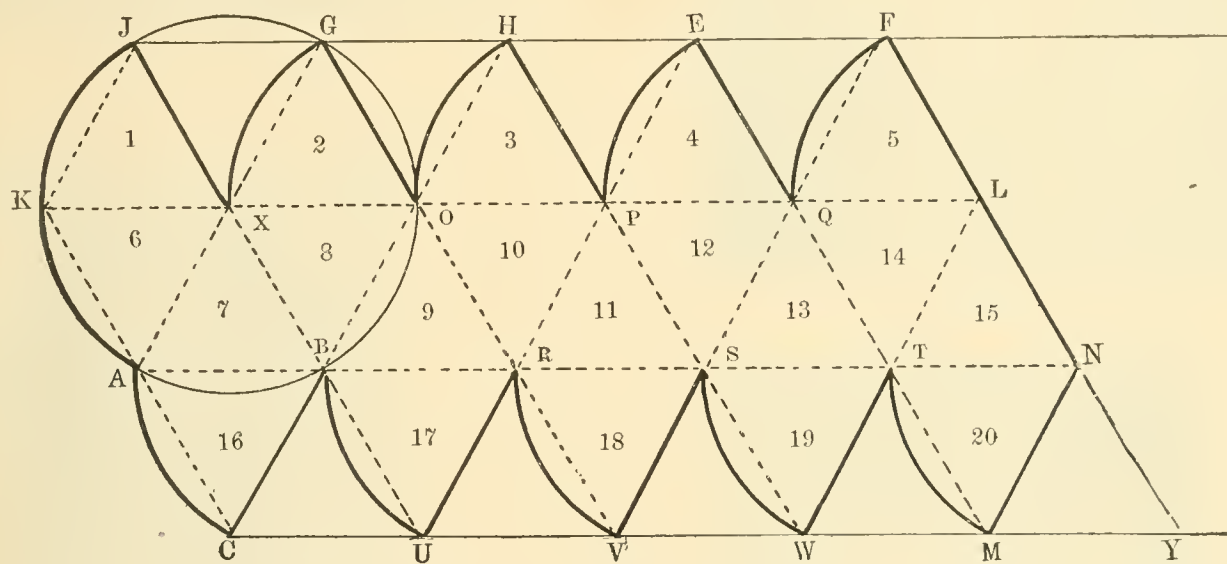
ICOSAHEDRON

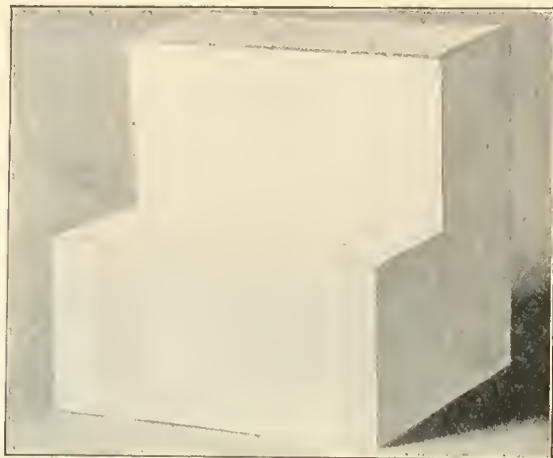
Directions for Constructing Model No. 14



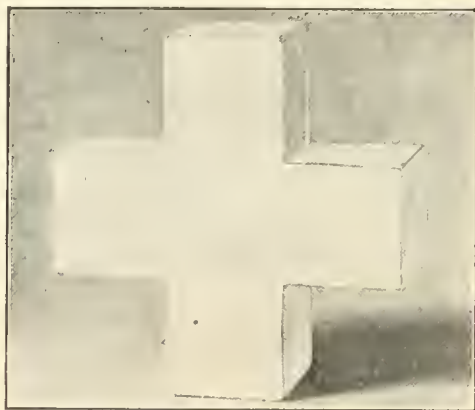
1. With X as center and a radius of 2 inches, describe circle JGOBAK.
2. Draw the right and left diameter KO, extending it towards the right indefinitely.
3. Inscribe regular hexagon JGOBAK within the circle.
4. On side AB construct an equilateral triangle ACB.
5. Extend side JG of hexagon to the right indefinitely.
6. Extend side AB of hexagon to the right indefinitely.
7. Through point C draw straight line ten inches to the right and parallel to line AB; mark line CY.
8. On extended line JG mark off three points H, E and F, each two inches apart.
9. On the lower line CY mark off five points U, V, W, M and Y, each two inches apart.
10. Connect by straight lines points J and U, G and V, H and W, E and M and F and Y.
11. Connect by straight lines points M and N, L and W, F and V, E and U, H and C, and G and A.
12. Place curved laps on sides GX, HO, EP and FQ.
13. Place curved laps on sides AC, BU, RV, SW and TM.
14. Cut on heavy lines; score and fold on dotted lines.
15. Paste model to form an icosahedron.

ICOSAHDREDON—Working Diagram

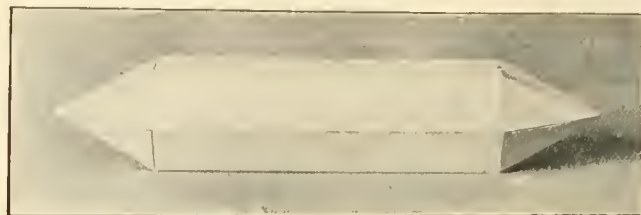




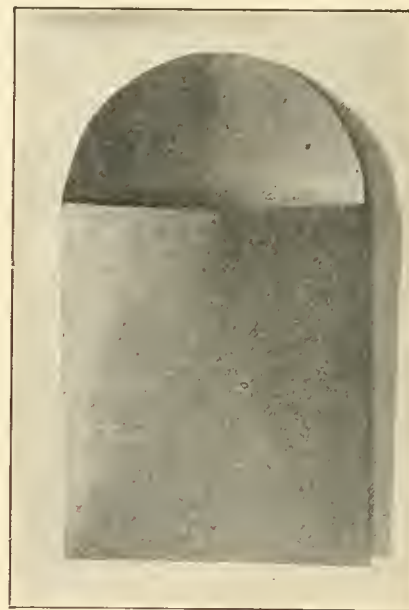
PAIR OF STEPS—Model No. 15



GREEK CROSS—Model No. 16



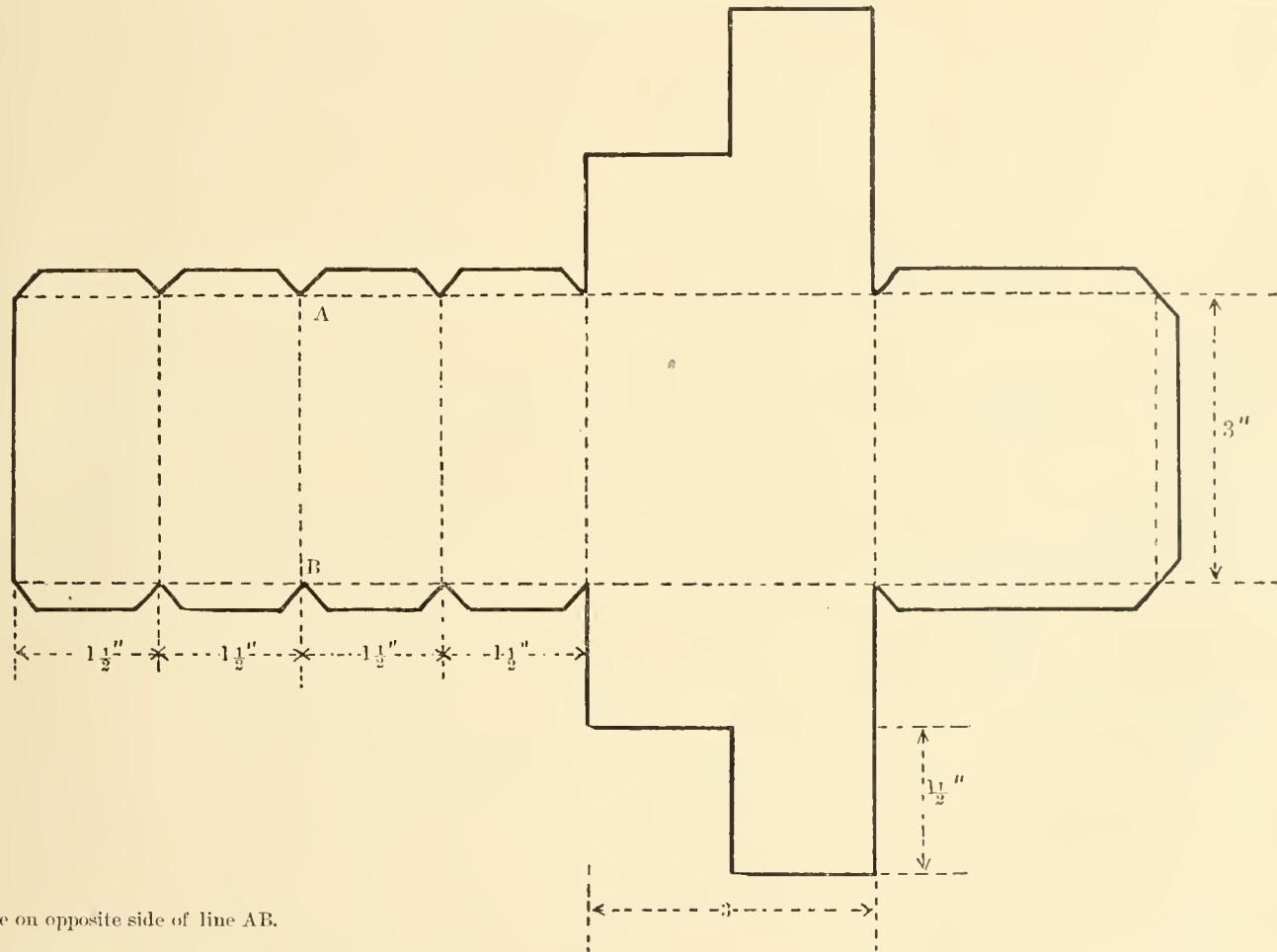
CRYSTAL FORM—Model No. 17



CARD HOLDER—Model No. 18

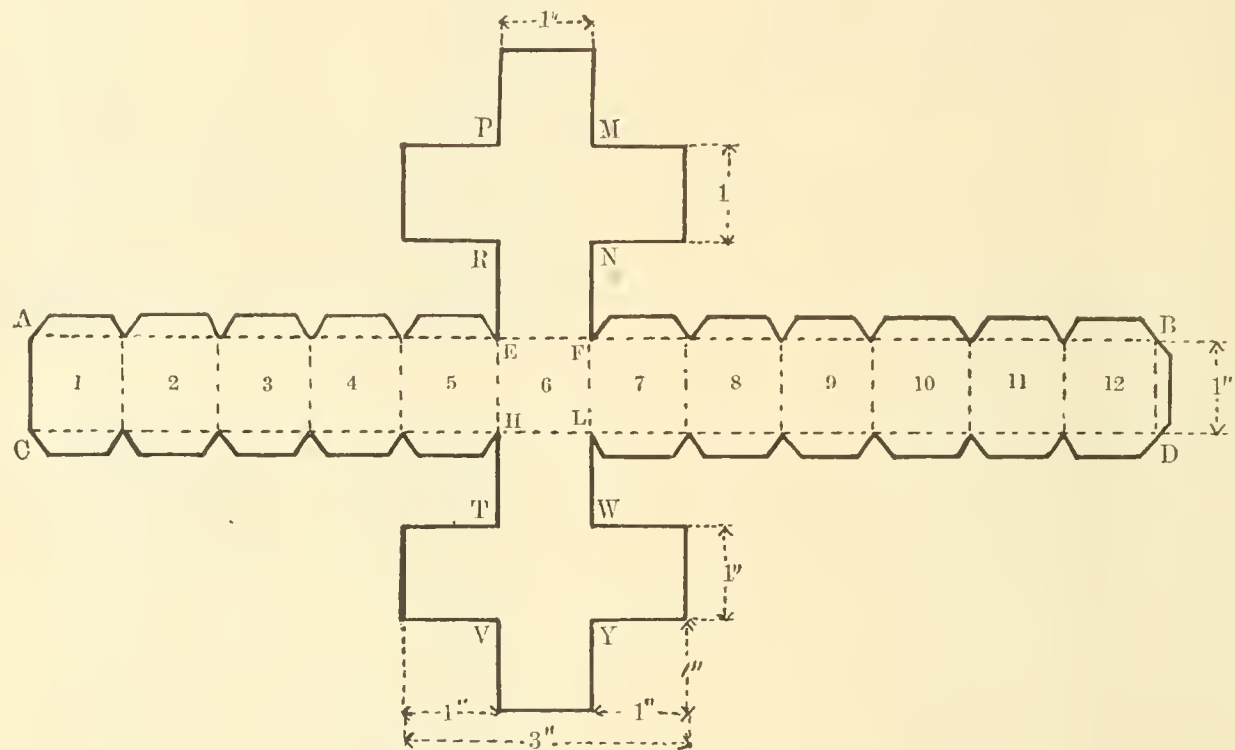
PAIR OF STEPS

MODEL No. 15



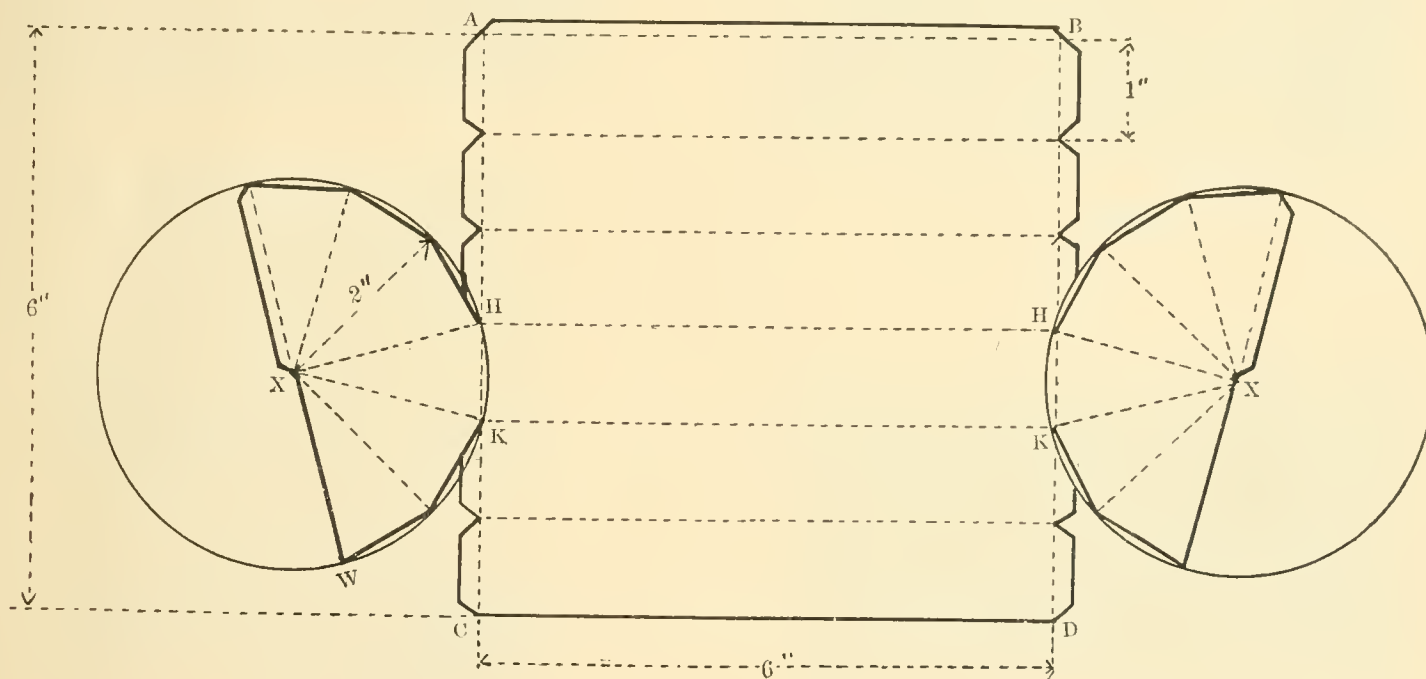
NOTE—Score on opposite side of line AB.

GREEK CROSS—Working Diagram



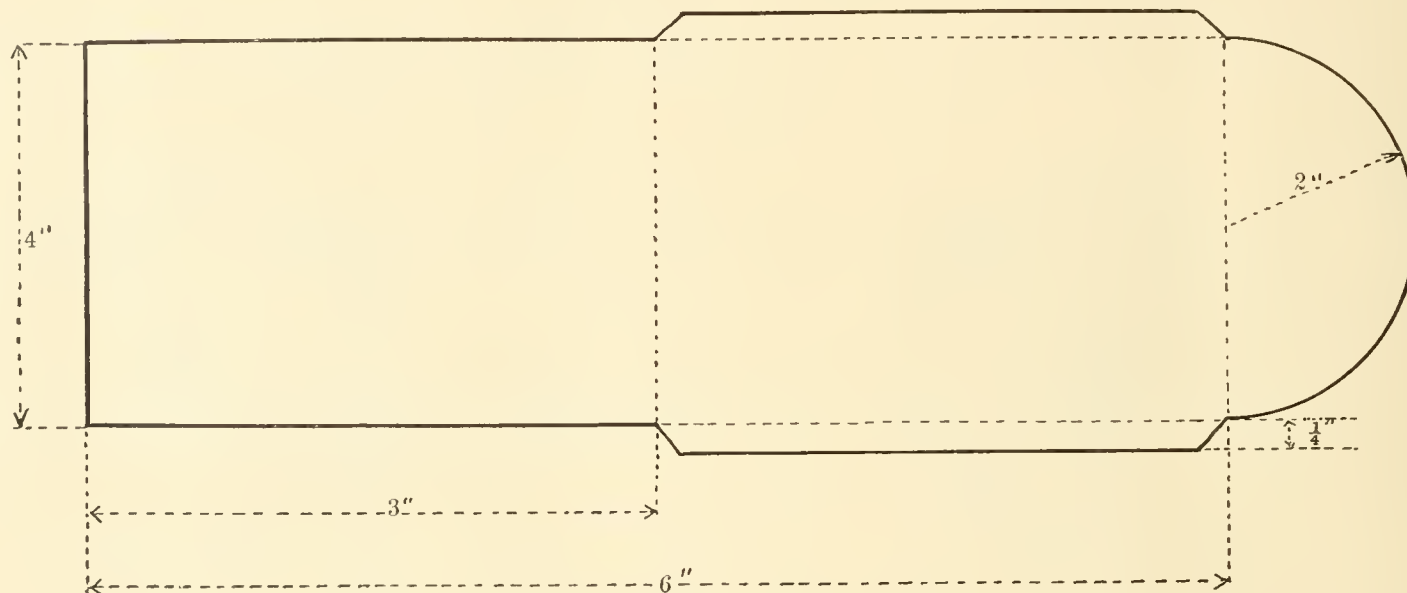
NOTE—Score underside of lines between squares 1 and 2, 4 and 5, 7 and 8, 10 and 11.

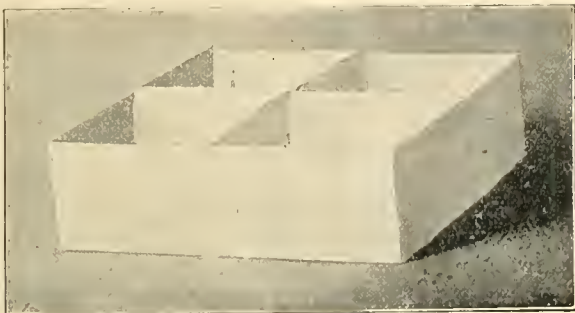
CRYSTAL FORM—Working Diagram



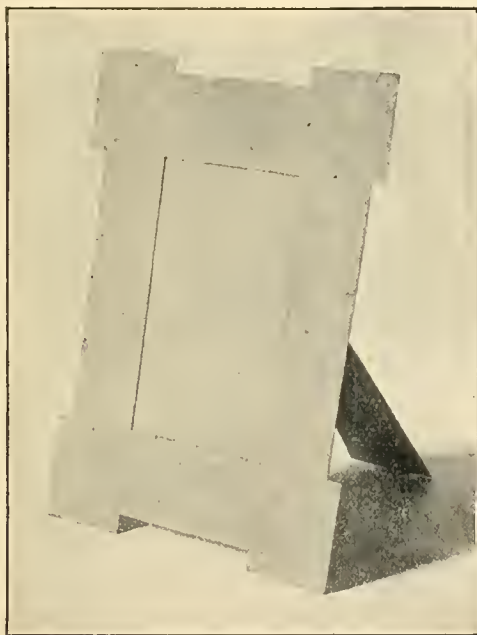
MODEL No. 18

CARD HOLDER—Working Diagram





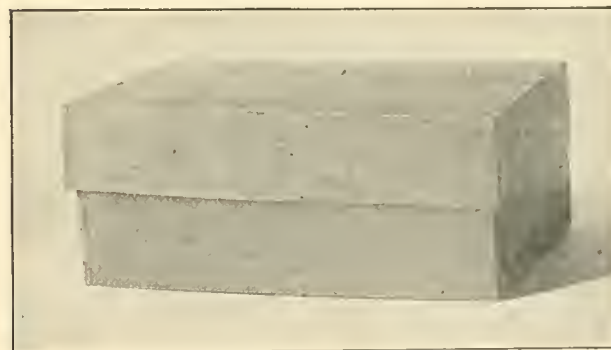
BOX WITH PARTITIONS—Model No. 19



PICTURE FRAME—Model No. 20

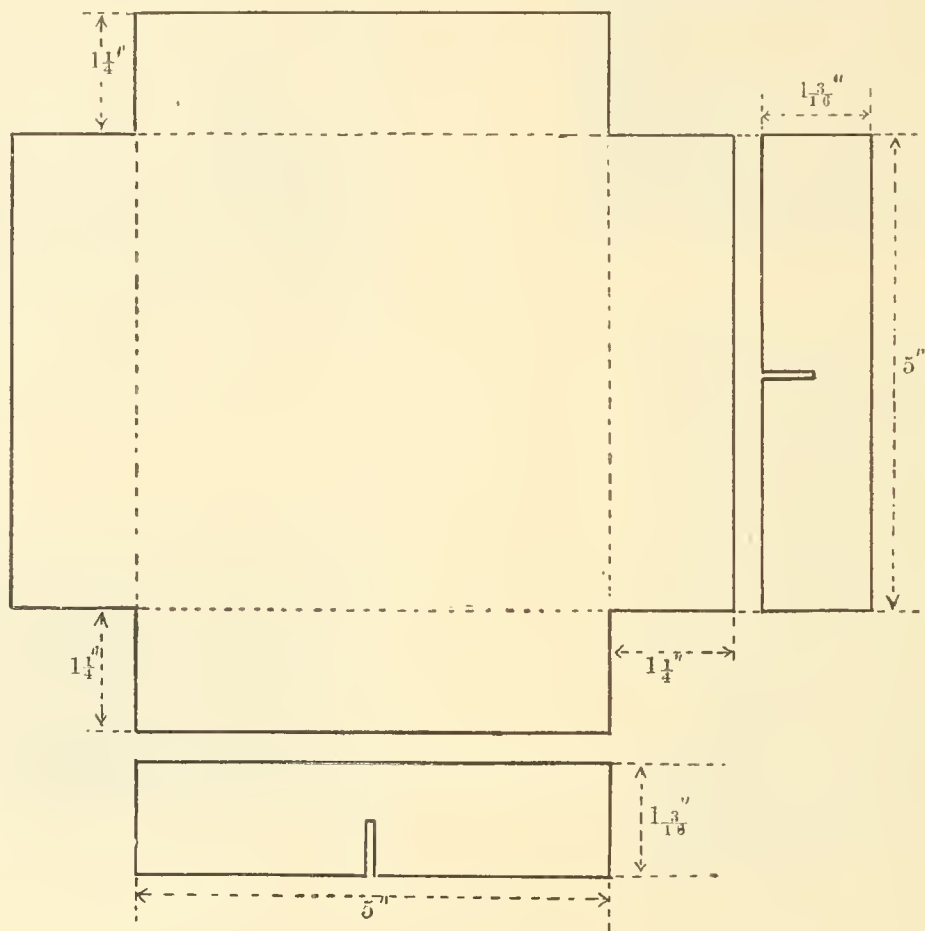


OBLONG TRAY—Model No. 21

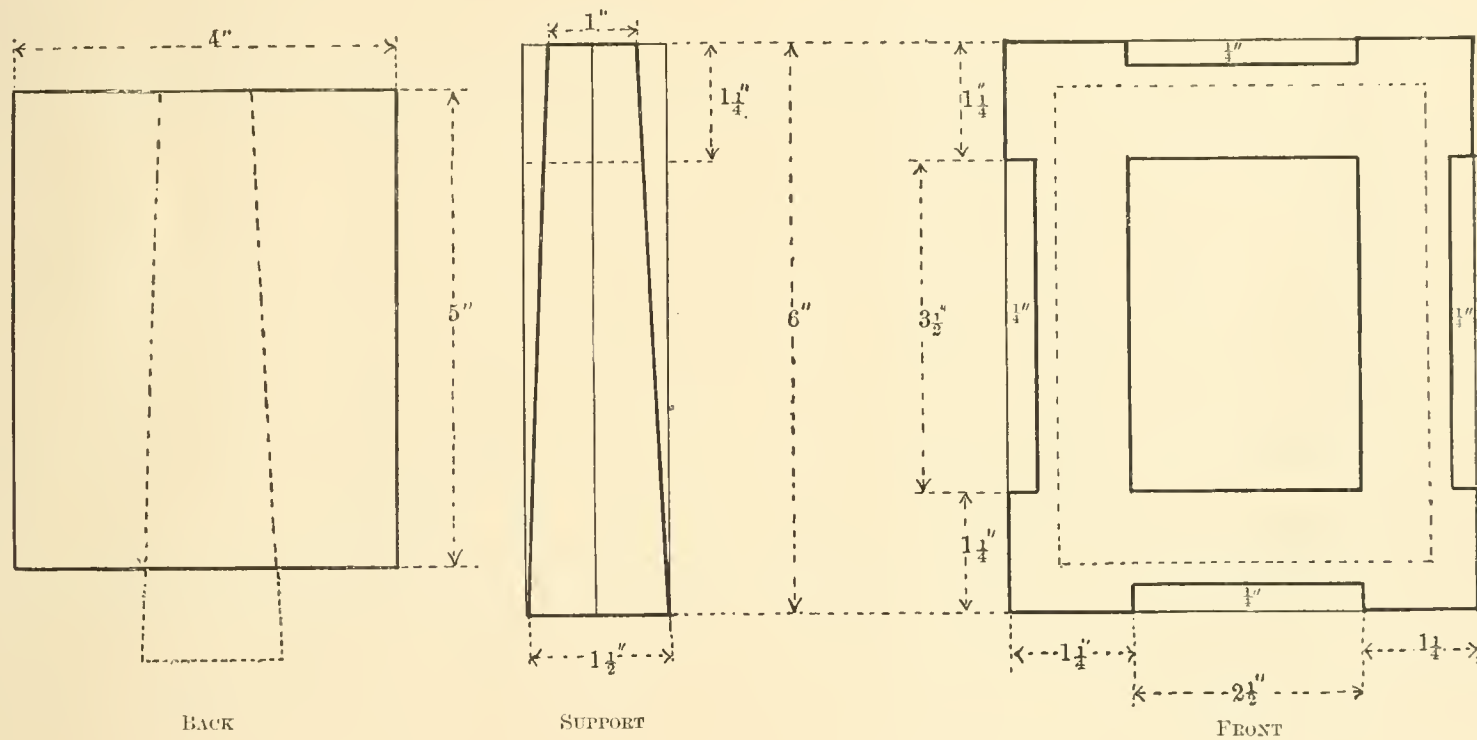


BOX WITH COVER—Model No. 22

BOX WITH PARTITIONS—Working Diagram

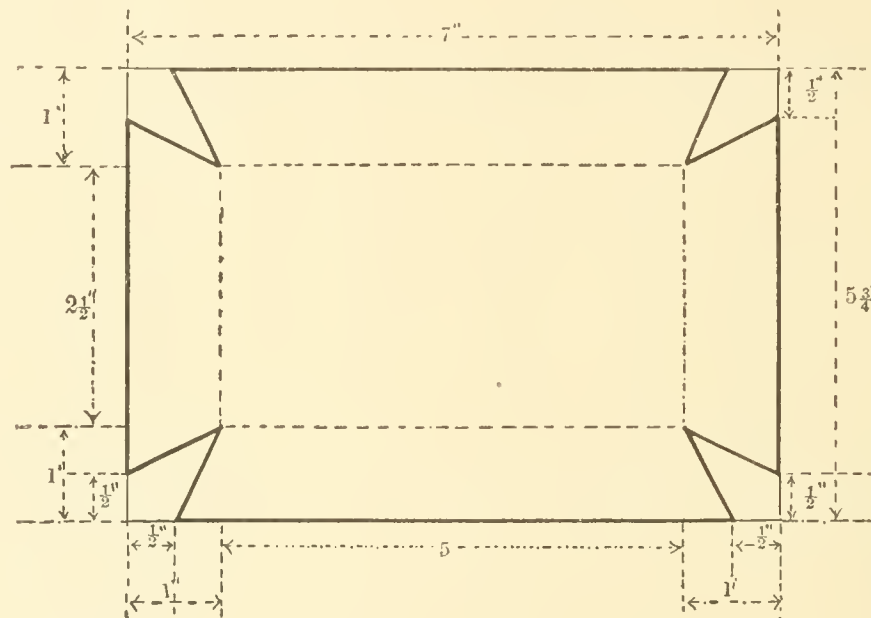


PICTURE FRAME—Working Diagrams



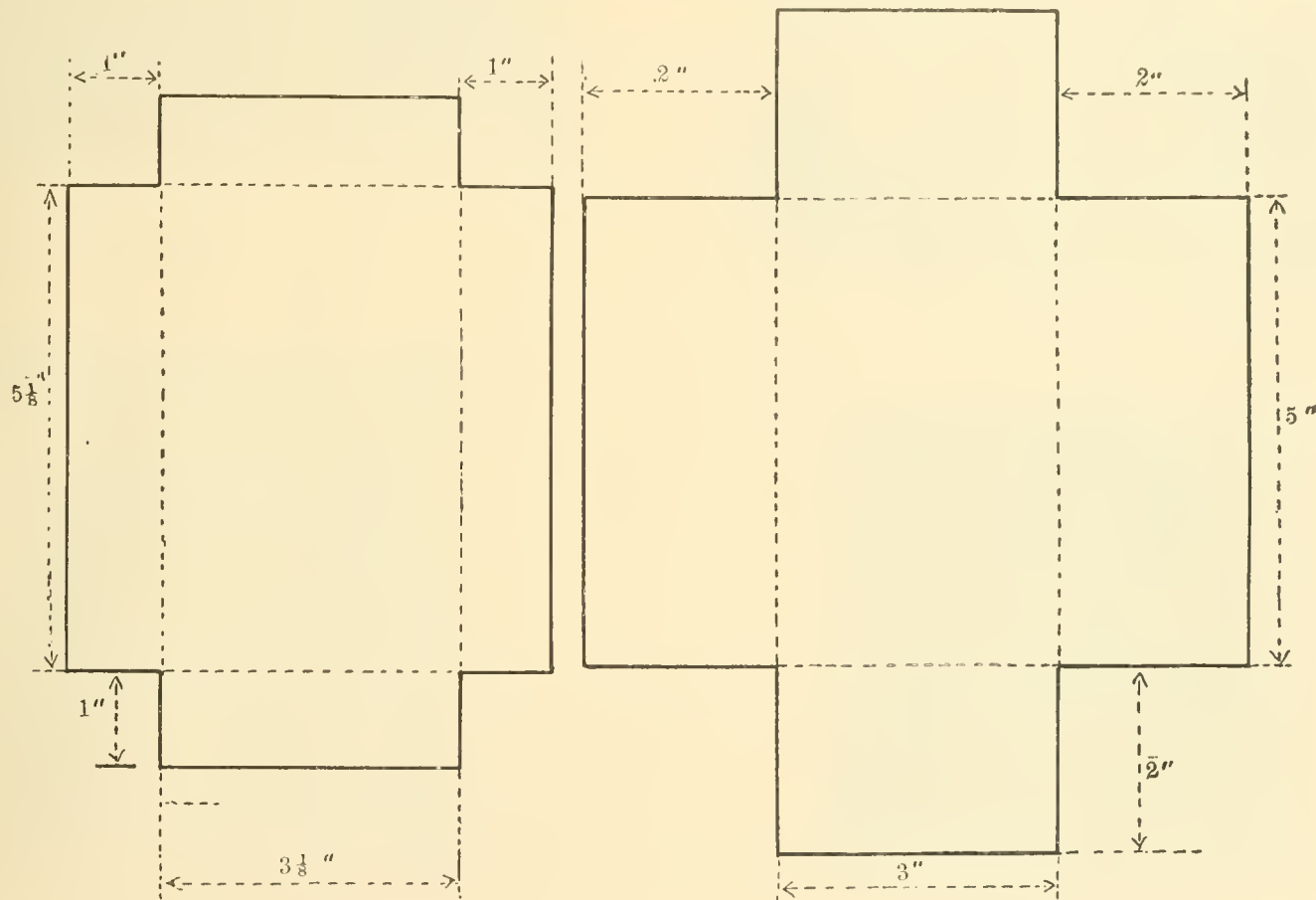
MODEL No. 21

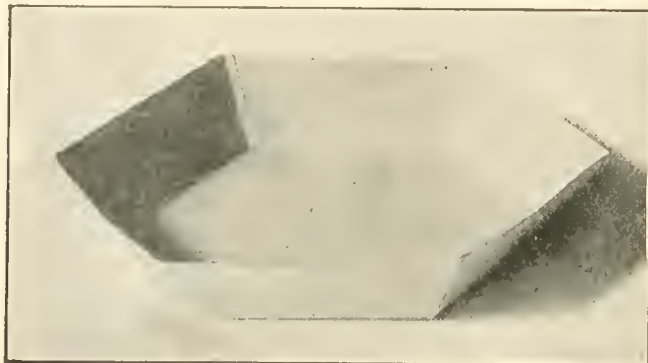
OBLONG TRAY—Working Diagram



BOX WITH COVER—Working Diagram

MODEL No. 22

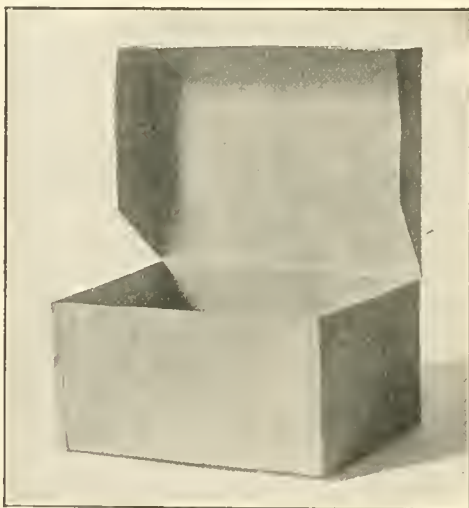




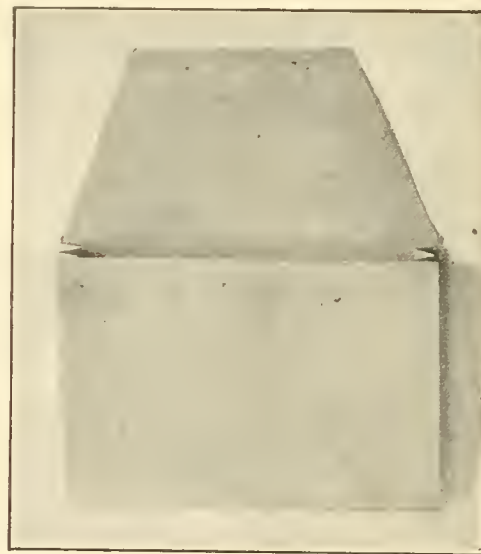
HEXAGONAL TRAY—Model No. 23



OCTAGONAL TRAY—Model No. 25



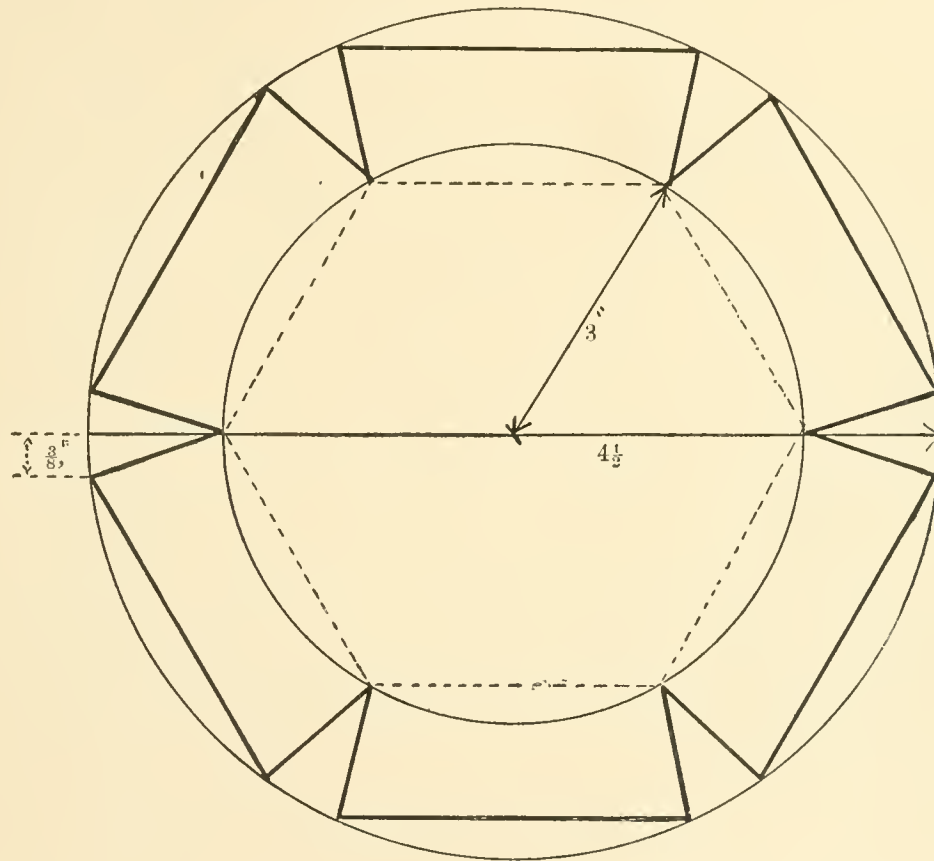
HINGED BOX—Model No. 24



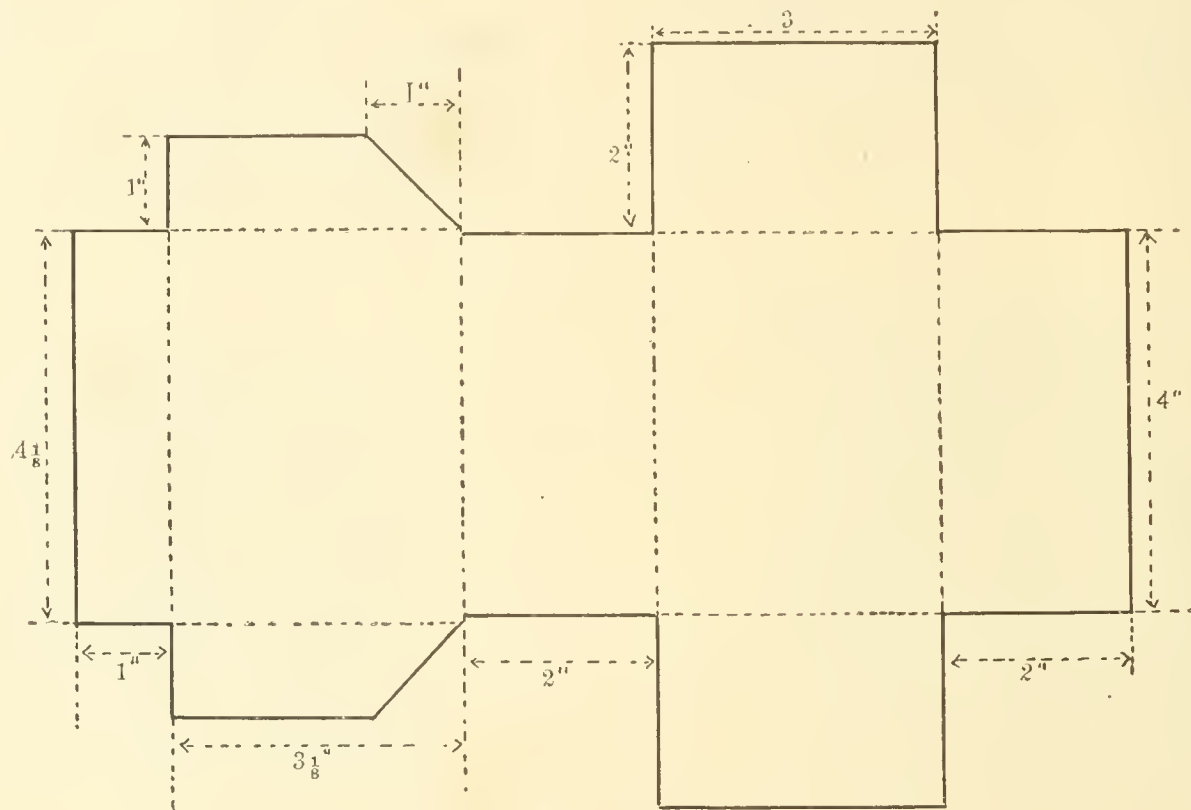
BILL HOLDER—Model No. 26

HEXAGONAL TRAY—Working Diagram

MODEL No. 23



HINGED BOX—Working Diagram



OCTAGONAL TRAY—Working Diagram

